M50 ONTOS AND M56 SCORPION 1956–70

US Tank Destroyers of the Vietnam War

KENNETH W. ESTES

ILLUSTRATED BY HENRY MORSHEAD
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NEW VANGUARD 240

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INTRODUCTION

This volume examines two similar vehicles developed in the same time frame, reflecting the post-World War II preoccupations of the US Army and Marine Corps (USMC) with countering opposing tanks, chiefly those of the Soviet Union.

Both these services had used tank destroyers in World War II, a peculiarly American innovation aimed at fielding specialized fighting vehicles optimized in mobility and firepower, but not armor, for the effective countering of mass motorized attacks first demonstrated by the Germans in 1939–40. Although the USMC soon relied mostly on infantry weapons for these tasks in the Pacific, the US Army organized a separate force completely independent of the Armored Force in order to acquire and operate these vehicles and equivalent towed weapons, the Tank Destroyer Command. After examining a plethora of designs, the Command manned and fielded four production tank destroyers during World War II. However, progress in tank design by the war's end outstripped the characteristics of tank destroyers and the Command was disbanded in 1945 while the Armor Policy Advisory Board ruled the tank as the sole desired antitank vehicle in 1949.

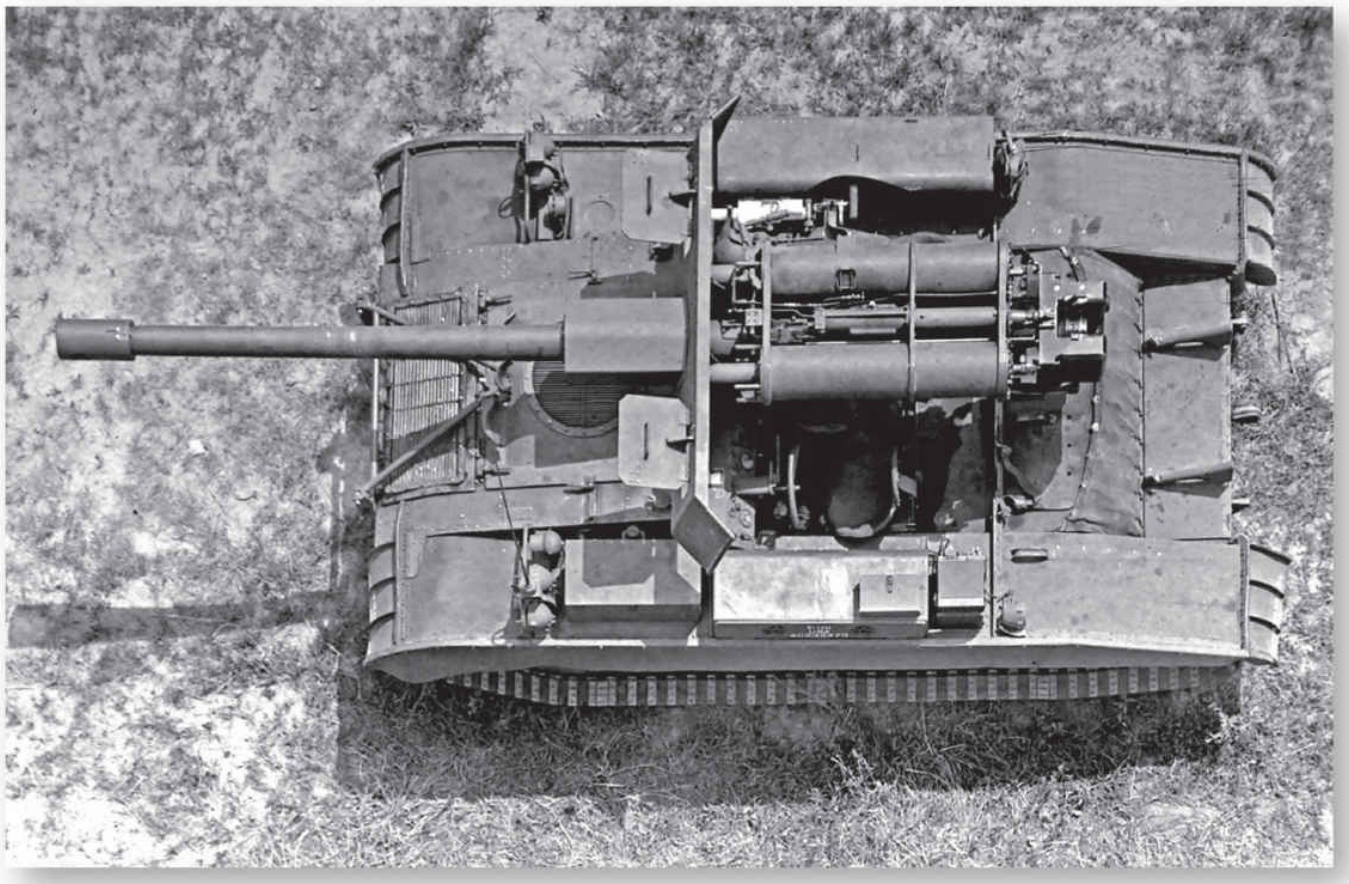
The Korean War, with its accompanying Tank Crisis for the Army and Marine Corps, revived interest in similar vehicles because World War II-vintage tanks supplied to the postwar infantry divisions at the regimental level were too cumbersome or ineffective for use in infantry close support. In addition, the Army's airborne forces now required air-droppable antitank vehicles and both Army and USMC plans called for a higher proportion of equipment to be air-transportable.

Thus, the United States unwittingly returned to the banned tank destroyer in both concept and design, fielding two models of gun motor carriages of similar general characteristics but of entirely different designs to bring light, mobile, and lethal antitank firepower to the infantry.

The similarities and differences of the M50 Ontos and M56 Scorpion stemmed in part from the different origins of each vehicle and each service then made separate decisions on acquisition and employment. The M56 evolved strictly as an airborne 90mm gun motor carriage small enough to be parachuted or delivered by glider during the initial airborne assault and establishment of the airhead. It eventually saw general use as an assault gun in both line and airborne infantry units in the 'Pentomic' period of the Army before being superseded in the airborne division by the M551 Sheridan after 1968.

The M50, on the other hand, first saw development by the Army as a family of small and mobile armored vehicles intended to provide armor protection down to the smallest units on the battlefield in a variety of guises, to include a 105mm recoilless gun version. Despite these expectations, only the latter vehicle became operational and only the Marine Corps procured it for fielding in new divisional antitank battalions.

The units thus assigned these vehicles operated them under tactics and techniques directly corresponding to those of the World War II Tank Destroyer Command, unintentionally and by default, given the similar characteristics of each generation's vehicles. The Marine Corps disbanded its last antitank battalions with their M50A1s in 1971, although a few vehicles continued in operation as late as 1980.



One of the two T101 pilot vehicles, soon after delivery. Although a three-man crew was planned initially, only two seats are apparent in this photo, for the driver and gunner. The gun shield remained unarmored and narrower in the production M56. (US Army).

CHRONOLOGY

1948

October 6–7 Conference on Antitank Defense convened at Fort Monroe establishes a requirement for an airborne, self-propelled 90mm antitank weapon.

1949

February 18 Report of Army Field Forces Advisory Panel on Armor outlined military characteristics for a self-propelled, airborne, antitank gun.

June 6 Logistics Division, Army General Staff, requests Chief of Ordnance develop the self-propelled airborne antitank gun with the least possible delay.

October 20 Ordnance Technical Committee approves development and manufacture of pilot models of the 90mm gun, T119 for tanks. Watervliet Arsenal provided specifications on January 9, 1950 for the modifications required for that gun to become the 90mm gun, T125 suitable for use in the self-propelled airborne antitank gun.

1950

February 16 Ordnance initiates development of Gun, 90mm, Self-Propelled, T101.

March 30 Ordnance initiates development of the 105mm recoilless rifle as the infantry battalion antitank weapon.

December 29 Army Equipment Development Guide states urgent requirement for full tracked armored carriers to transport personnel and cargo over fire-swept areas; said vehicles adaptable to other essential needs, e.g. infantry assault and antitank purposes by mounting the 105mm recoilless rifle on the basic chassis.

1951

February 21 Chief of Ordnance directs Detroit Arsenal to study the feasibility of a light infantry vehicle, suggested to him by Chief of Army Field Forces, General Mark Clark, for a “small, lightly armored, cross-country vehicle.”

March 9 Detroit Arsenal presents concept designs for the Infantry Assault Vehicle, also called “Infantry Fighter,” created by the Arsenal, General Motors, Ford, and Allis-Chalmers, to the Chief of Army Field Forces conference at Fort Monroe. The military characteristics were confirmed.

April 9 Follow-on conference at Ballistic Research Laboratory, Aberdeen decides to mount four 105mm recoilless rifles on the Detroit Arsenal design. The Arsenal increased this to six rifles on June 21.

July 20 Detroit Arsenal hosted a conference to review mock-ups and firm the characteristics on the proposed gun infantry antitank self-propelled (Infantry Fighter Vehicle) and six-man personnel carrier.

September 11 The beginning of liaison between Project Vista, creator of the Ontos Concept, and Army Ordnance.

September 21 Chief of Army Field Forces presents requirements for pilot versions of Ontos vehicles.

October 4 Initiation of Ontos Vehicles development project, with endorsement to the Army chief of staff by Secretary of Army Frank Pace.

1955

February 10 Ordnance Technical Committee classifies Rifle, Multiple, 106mm, Self-Propelled, M50 (T165E2) as standard type for the Marine Corps.

November 2 Ordnance Technical Committee classifies Gun, Self-Propelled, Full Tracked, 90mm, M56 (T101) as a standard type. It was released on November 8 for production engineering.

1956

October 31 First M50 Ontos delivered to USMC by Allis-Chalmers Manufacturing at La Porte, Indiana.

1957–58

Dec 1957–June 1958 Complete order of 160 M56 vehicles manufactured by Cadillac Motor Car Division, General Motors Corp at its Cleveland, Ohio Tank Plant.

DESIGN AND DEVELOPMENT

Both the British and US armies studied the possible employment of tanks in the airborne forces they set out to form in the early days of World War II. The results were scarcely promising, for no large cargo parachutes yet existed and the British alone produced a glider, the Hamilcar, which could deliver useful loads. But their Tetrarch and the American M22 light tanks contributed little to the defense of the landing areas where they were used, and the operational nightmare for airborne forces remained a counterattack by opposing armored forces, just as it did for modern amphibious forces.

In the aftermath of the war, antitank defense returned to prominence as a critical component of land warfare when the Cold War gained importance and the former Western Allies found mostly obsolete tanks and antitank weapons in their inventories. However uncertain the power of the Soviet Army might be, its numerical superiority and large number of new heavy tanks posed sobering problems for planners.

The lessons of the British airborne assault at Arnhem in 1944 had not been lost on the US Army, and postwar the US Army issued some of its slender inventory of T8 90mm antitank guns to its three airborne divisions. Not only were these 7,800lb guns difficult to load into and parachute from the current C-82 Packet medium assault transports in the initial assault phase of an airborne operation, but once on the ground they were almost impossible to manhandle. At an Antitank Defense Conference hosted by Army Field Forces in late 1948, new requirements were determined by the airborne representatives for a lightweight 76mm antitank gun and a lightly armored self-propelled 90mm gun, weighing 16,000lb, combat loaded. The self-propelled vehicle design would fit the weight limits of the proposed heavy assault glider and the C-82 aircraft and thus be capable of parachute delivery in the Phase I assault of the airborne division. It would be fully tracked and use the same 90mm ammunition as the standard American medium tank, which would make up part of the usual link-up force.

The M56 Scorpion

The Ordnance Department initiated its project for the Carriage, Motor, 90mm Gun, T101 on February 16, 1950, following a feasibility study of a 90mm gun similar to the new T119 tank weapon, but with reduced height and weight to meet aircraft loading standards. The resulting T125 90mm gun entered development on May 2. Because the antitank deficiency of the airborne forces had attracted enough attention, both projects received a class 1B priority in the Army procurement system, second only to the Army's transporter system being developed for the atomic cannon. The British Army also indicated interest in this project and within two months provided dimensions of its Hamilcar I glider's cargo compartment.

Making the powerful 90mm tank cannon of the day fit into an 8-ton combat weight package, capable of a minimum speed of 25mph, carrying at least 20 rounds of ammunition with a land range of at least 100 miles, proved a significant challenge. It proved impossible to provide armor protection of any type, nor any enclosure against the elements. A riveted aluminum hull and gun shield made up the vehicle with an enclosed front-mounted engine and open gun mount placed in the center over the fuel tank. The

T125 gun redesign of the base T119 tank cannon to meet height limitations of the vehicle required replacing four recoil cylinders with two long recoil slide rails on top of the gun, drawing pistons through two larger cylinders. These likely contributed to the nasty hopping of the front end of the vehicle whenever the gun was fired. The gun, classified standard type as the M54, was 210lb lighter than the M36 (T119) tank cannon, and could fire most of the 90mm ammunition for the earlier M3 tank cannon. A blast deflector and counterweight were fitted to the muzzle. Fire control consisted of a T186 telescope with 4–8 power variable magnification. The gun was manipulated with manual controls for 10 degrees depression, 15 degrees elevation and 30 degrees traverse to each side. Unfolding a loading platform at the vehicle rear gave access to 29 rounds of 90mm ammunition in individual stowage cylinders, an impressive load for such a diminutive vehicle.

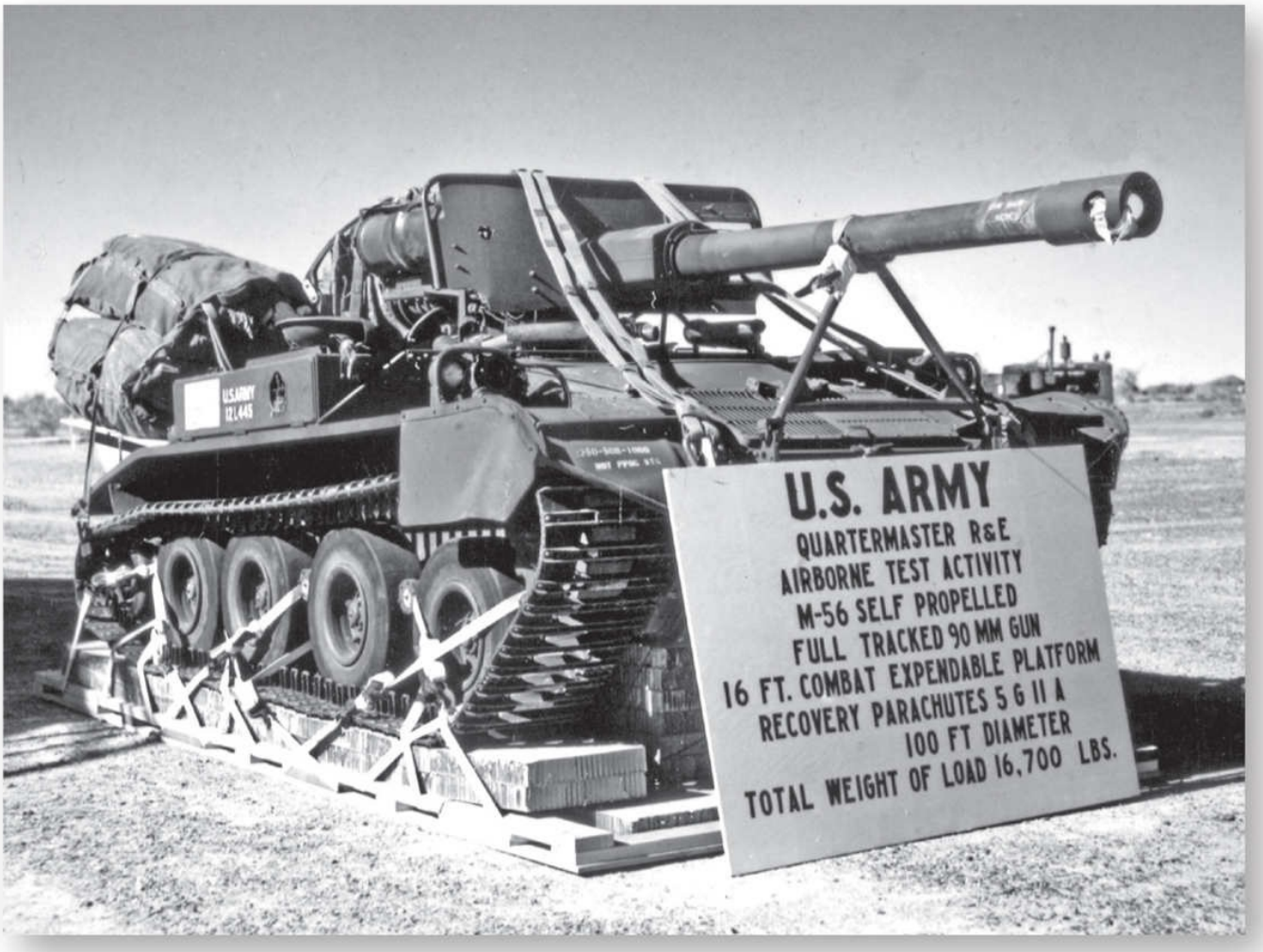
Pilot number two at Aberdeen Proving Ground, June 3, 1952, shows a bucket seat for the loader, facing to the rear, and it was later moved to the side. The stowage for 29 90mm rounds later included a folding platform for the use of the loader. (US Army)

A Continental AOI-402-5 200hp opposed six-cylinder, air-cooled, gasoline engine provided power to an Allison CD-150-4 cross-drive transmission for propulsion, steering, and braking. The torsion bar suspension system used eight pneumatic rubber road wheels inflated to 75psi and capable of running flat for 15 miles at 15mph. Solid rubber track idler wheel and drive sprockets completed the suspension for the 20in-wide band track,

eight shoes per section, eight sections per track. Ground pressure was a mere 4psi.

The design eventually specified a four-man crew but only the driver and gunner occupied proper positions within the vehicle, and the loader and vehicle commander were given bare seats fixed to the tops of fender stowage boxes.

Only two T101 pilots were built in 1952 for the vehicle, delivered by General Motors and tested at Aberdeen Proving Ground and environmental test centers. Pilot number two was successfully parachuted five times at Fort Bragg, North Carolina from C-119 aircraft. The vehicles passed Army Field Forces testing in September 1955. On November 2, the T101 was classified standard type as the Gun, Self-Propelled, Full Tracked, 90mm, M56 (T101) in the cumbersome nomenclature of the day. For the troops, though, it quickly became the “SPAT” (Self-Propelled Anti-Tank).



Fully rigged for air drop, with the cargo parachutes grouped on an expendable retainer at the rear, the production M56 met the specifications of the airborne divisions to be delivered in the initial assault phase. (US Army)

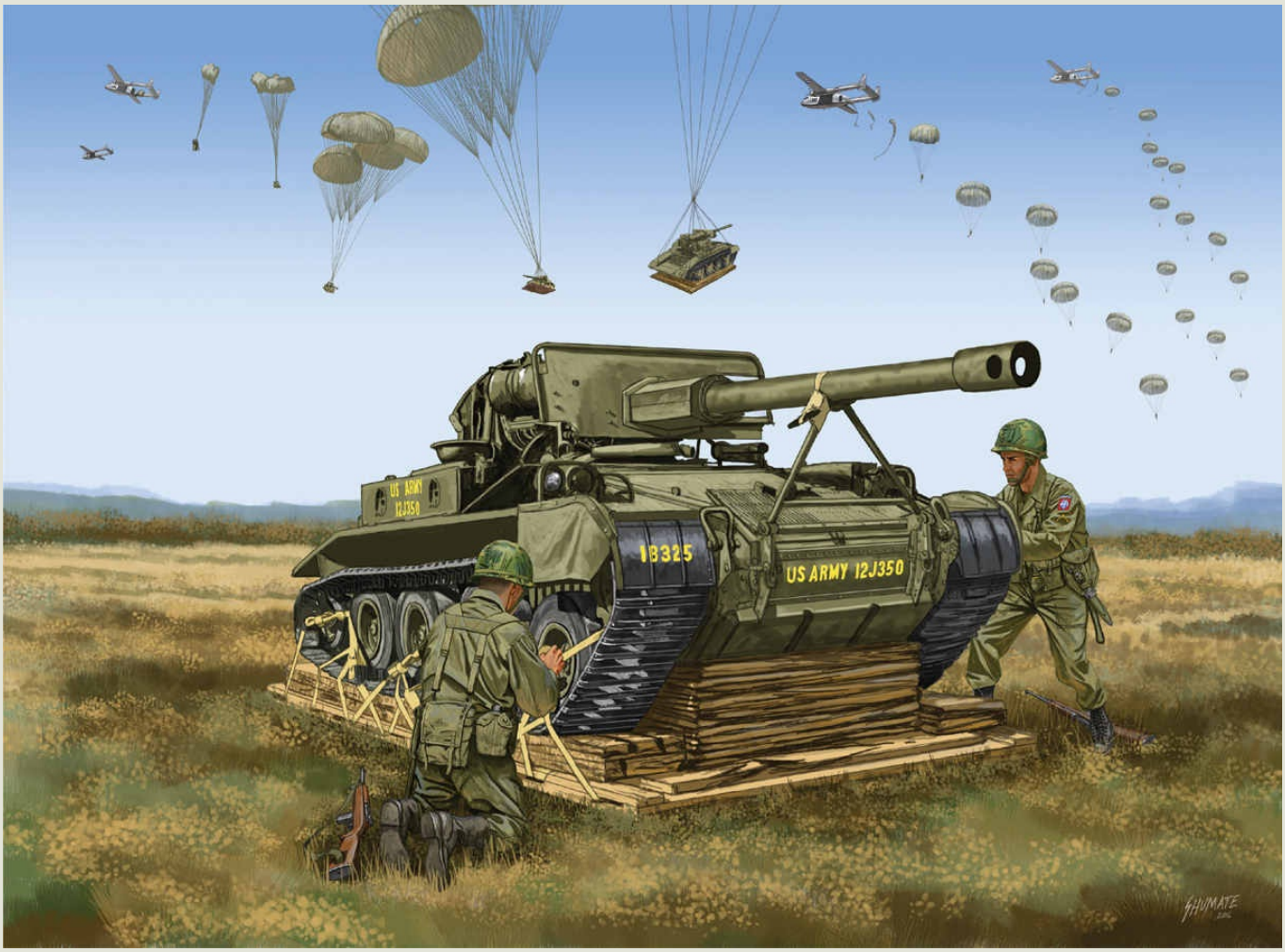
The urgency to develop and field this vehicle had little effect upon the time required to engineer the design for production and line up a production facility for the effort. General Motors’ Cadillac Division tank plant at Cleveland, Ohio was selected as a sole source of supply, made available with the completion of its work on the M41 light tank. The first M56 was assembled in December 1957, with completion of all 160 vehicles accomplished by June 1958.

On March 22, 1957, the nickname “Scorpion” was proposed for the M56 to the Chief of

Ordnance and it gained official approval shortly thereafter. The 160 vehicles presumably represented the requirements for three airborne tank battalions of 53 vehicles, each intended to equip the three airborne divisions of the Army, the 11th, 82nd, and 101st. But issuing the M56 to the Army operating forces ran immediately into the problems of a major reorganization, as covered in the next chapter.

Moreover, a decade had elapsed since the airborne forces had registered their “urgent” requirement for a mobile 90mm antitank gun and the simple vehicle that Ordnance had developed by the mid-1950s reflected no advanced combat vehicle technology. Thus it comes as no surprise that Ordnance began an “Airborne Assault Weapon System” project to study future needs and concepts on April 6, 1956. It was terminated shortly thereafter due to lack of funds, but the idea remained clear. It was followed by an antitank guided missile requirement (March 26, 1958) and the initiation of an Armored Reconnaissance/Airborne Assault Vehicle development (November 5, 1959) that eventually became the M551 General Sheridan.

A AIRBORNE M56s PARACHUTING INTO ACTION



This shows the M56 vehicles of the 82nd Airborne Division being landed by cargo parachutes and being placed into action by crews, as part of a major parachute assault operation. In the background one sees parachutists dropping into nearby landing zones, but the M56 vehicles are going into a separate field in the foreground. We see several suspended in mid-air, one emerging from the C-119 transport aircraft, and one in the close foreground already on the ground being prepared by its crew.

This relatively chaotic scene relates to the original requirement that the M56 be capable of parachute delivery at the very outset of the assault, in order to secure the operation against armored counterattack. The Air Force C-119s are dropping M56s, each rigged with six G-11 cargo parachutes of 100ft diameter each. The risers of the six parachutes are usually gathered together by a special ring about 15ft above the vehicle.

In the foreground rests an M56 being prepared for action by the first two crewmen on the scene. Apart from the crew, the vehicle was delivered armed and fueled on a wooden pallet, with dense packages of cardboard blocks adding support to the hull and suspension upon impact.

Tactical markings show the M56 as part of 1st Battle Group, 325th Parachute Infantry Regiment.

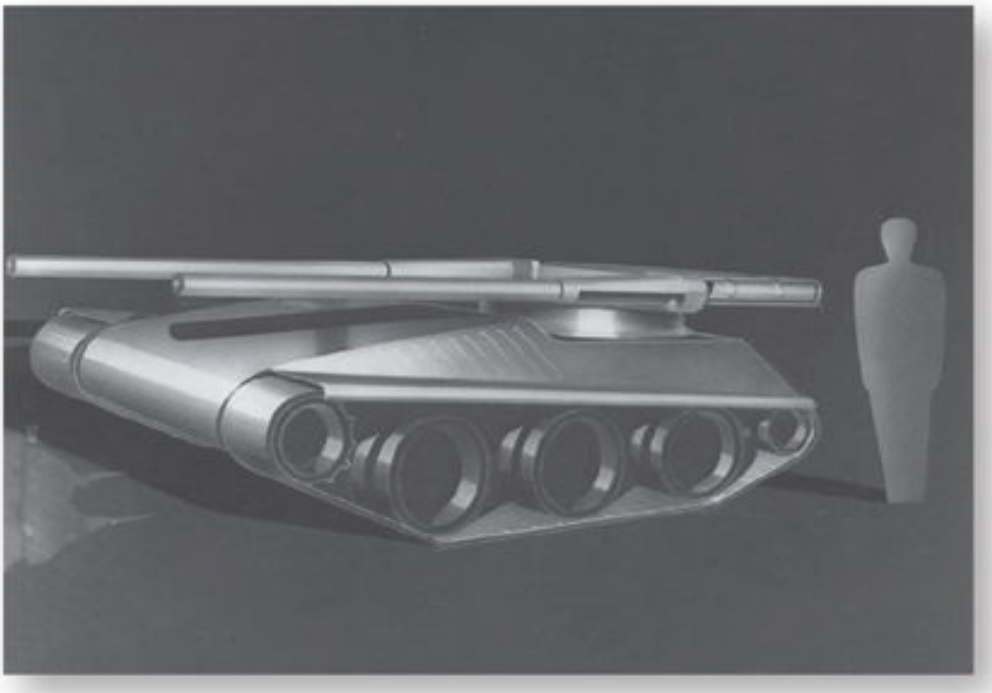
The M50 Ontos

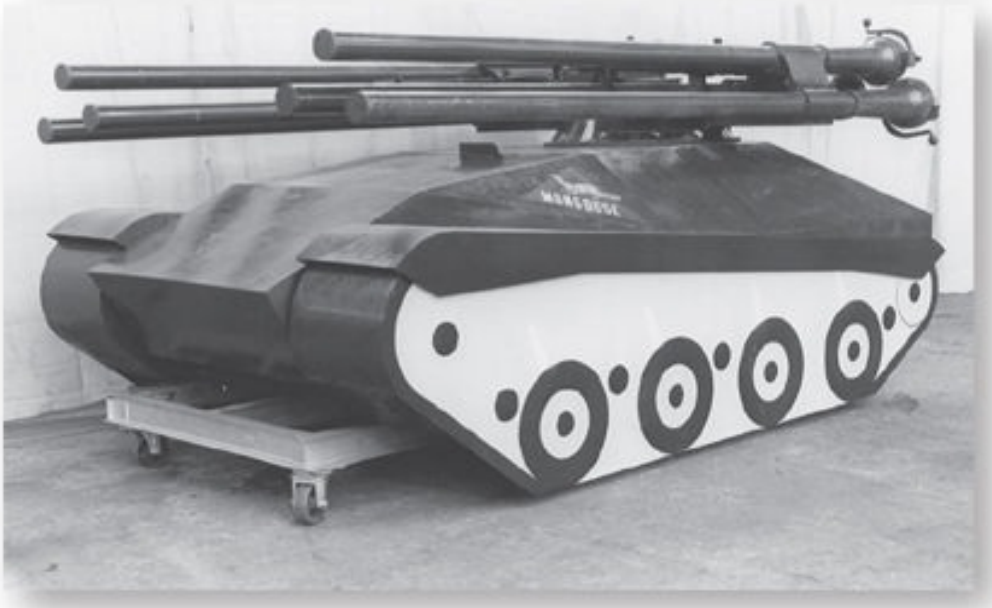
The coming of the Korean War had demonstrated that the rest of the Army also "urgently" required improved armored vehicles and firepower, and this requirement was summarized in the *Army Equipment Development Guide* (December 29, 1950):

> …full tracked armored carriers to transport personnel or vital cargo over fireswept areas … These vehicles should be adaptable for infantry assault and anti-tank purposes by mounting the 105mm recoilless rifle on the basic chassis.

Already appalled by the casualties suffered by United Nations (UN) forces in the first months of the Korean War, the service leadership, especially Secretary of the Army Frank Pace, but also the Army Chief of Staff General J. Lawton Collins, brought high-level interests into play on this particular requirement. The following February, Army Ordnance began work on this requirement when the chief assigned Detroit Arsenal the task of studying a vehicle contemplated by Major General Rex W. Beasley, Head of Research and Development at General Mark W. Clark's Headquarters, Army Field Forces, Fort Monroe, Virginia. Beasley's description of a "small, lightly-armored, cross-country vehicle" could be met by a design along the lines of the existing Weasel or British Bren Carrier, the Ordnance staff suggested to the arsenal personnel. The arsenal staff convened a conference on March 8, to which they invited representatives of Allis-Chalmers, Ford, and General Motors.

Engineers Carl S. Rasmussen (Chief, Combat Vehicles Branch) and R. Reinke then presented the Detroit Arsenal design and those of the three manufacturers at a meeting on the "Infantry Fighter Vehicle" with Army Field Forces the next day at Fort Monroe. It was here that the design began to take on firm characteristics with the addition of comments from the Field Forces staff. Major General John W. O'Daniel commented on the tactical use of the vehicle, stating that it could be used in large quantities as a "tank killer." Built with the lowest possible profile, protected against small arms fire and artillery fragments, and armed with the new 105mm recoilless rifle, it could prove lethal against the heaviest tanks. Manufactured as cheaply as possible, it would be classified as an expendable item. A speed of 25mph with great agility over rough and muddy terrain would prove a key characteristic.





Models and mock-ups prepared May–July 1951, for the Infantry Fighter project, armed with two, four, and six guns. Note the name "Mongoose" on the last, probably suggested by the Detroit Arsenal. (US Army)

General Beasley requested of Mr. Rasmussen that Detroit Arsenal work immediately on an improved design without awaiting formal directive from Ordnance, in order to avoid the usual time lapse (until March 26 in the event). He agreed and the arsenal began continuous work on the project. The next meeting convened on April 18 at the Ballistic Research Laboratory, Aberdeen, for discussion of the "Infantry Assault Vehicle" feasibility and general configuration. The arsenal had numerous designs to present and the debate ensued over desired firepower. At meeting's close, the participants agreed on the arsenal chassis design, mounting four 105mm recoilless rifles. The arsenal then constructed a full-scale mock-up of a vehicle with that armament, powered by a commercial engine. Agreement was reached on June 21, 1951 to use the GM 302 truck engine with an XT-90 cross-drive transmission in pilot models. The number of recoilless rifles was raised to six. Throughout this period, the armed assault vehicle was referred to variously as "The Infantry Fighter" and "The Infantry Gun Vehicle." The infantry troop and cargo carrier lagged in development while the basic chassis of the assault vehicle was being determined.

While the Detroit Arsenal worked with Ordnance and Field Forces commands on the Infantry Fighter and the troop carrier designs, the automotive industry probably relayed some knowledge of these projects to Project Vista scientists and engineers engaged in work during April–December 1951 on an Army-contracted study with Air Force and Navy participation that aimed at improving the ability of the United States and the North Atlantic Treaty Organization (NATO) to defend Western Europe from a Soviet attack. The California Institute of Technology (then operating the Jet Propulsion Laboratory) directed Project Vista for this largest peacetime summer study to date by an American university. While the mobilization of civilian science and engineering was commonplace in the age of total war, carrying out the same in peacetime was at this point still in its infancy.

About 120 scientists and engineers performed the work, initially aimed at improving the use of tactical air power in a NATO ground war defending Western Europe. However, they also formed task groups to examine field forces and the conduct of the defense on the ground, and myriad other activities. Although the final report of Project Vista was not delivered until early 1952, much progress had been accomplished in its first months of activities, briefings, and field visits. The staff group assigned to field force weapons, armor, and transportation took particular interest in the new recoilless rifles and the potential of their shaped-charge munitions to penetrate and destroy the largest and heaviest tanks in use. In considering defense against enemy armor, the group rejected the dogma that tanks are the best defense against other tanks. Instead:

> our antitank defense of Western Europe must rely primarily upon mines and ONTOS [a Greek word for "thing" or "entity"]. Tactical air will be a powerful weapon after air parity is established.

The report continued with the observation that:

> the ONTOS is a new weapon which cannot be compared with our ineffectual tank-destroyer units of World War II. We have never combined [with mines] the advantages of each of these weapons into an integrated system.

Effectively, the scientists advocated a NATO defense of Europe with strongpoints well protected by mines and supporting artillery and air power, occupied by entrenched

infantry and hundreds of small and agile antitank Ontos vehicles that employed multiple recoilless rifles to engage and overwhelm approaching tanks and fighting vehicles with deadly fire. Because of the low cost and simplicity of the vehicle, "our requirements for 6,636 Ontos antitank vehicles, six million conventional antitank mines and 14 million unremovable antitank mines is within the capacity of NATO to supply on position within a relatively short time."

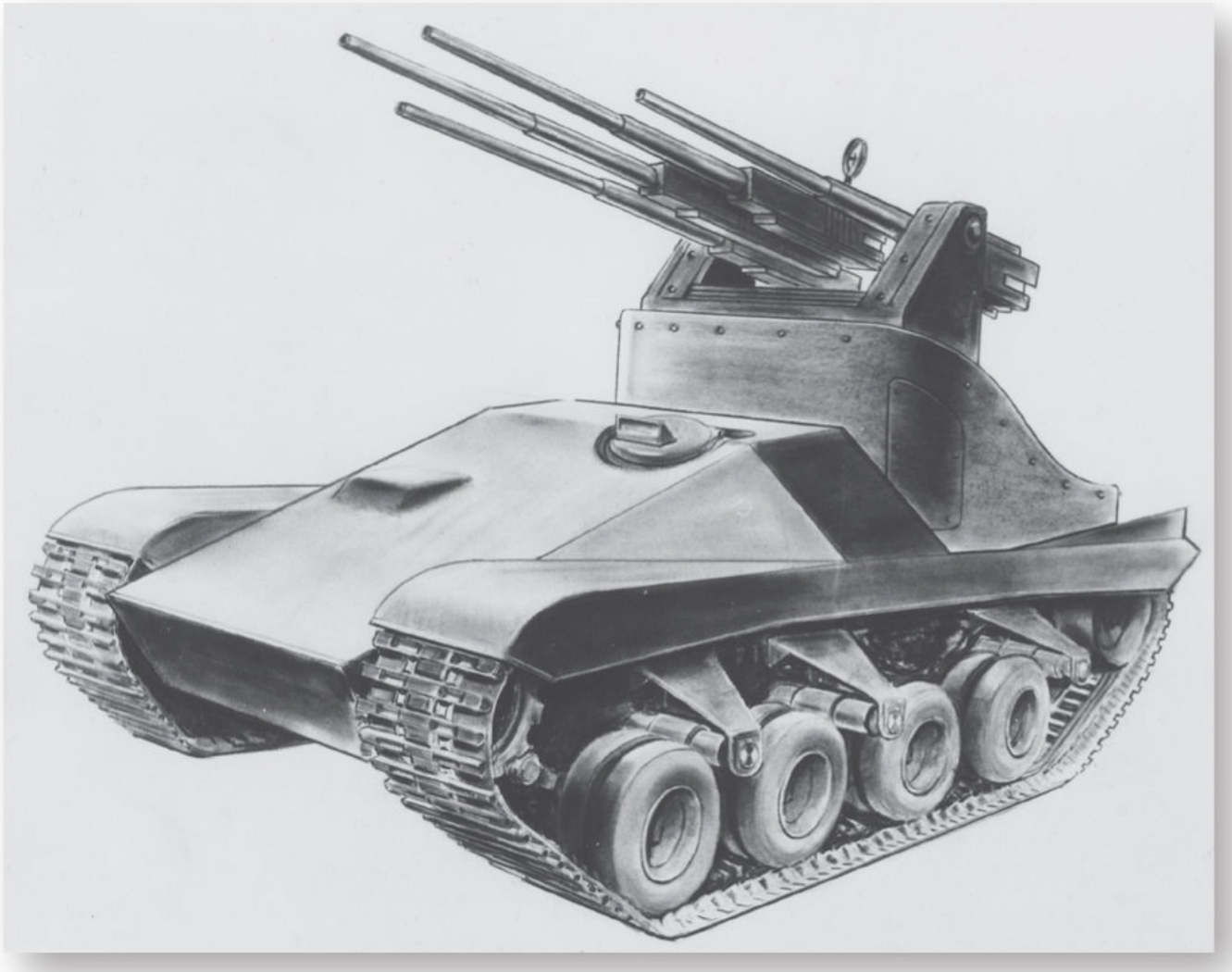
Major Systems for NATO Defense against Major Elements of Soviet Offensive Power

Soviet Weapon	Primary Neutralizer	2nd Neutralizer	3rd Neutralizer
Tactical air	Atomic bomb	Air forces	Antiaircraft weapons
Mass artillery	Tactical air	Atomic bomb	Artillery
Atomic bomb	Wide front defensive	Medical service	-
Mass armor	Mines	Ontos	Tactical air
Mass infantry	Rockets	Artillery and additional water-cooled machine guns	Atomic bomb
Gas	Wide front defense	Gas masks	Medical service
Airborne and partisan	Mobile striking force	All-around ground defense	Communications

Source: "Defense on a Wide Front," Appendix 3A5, Volume Two, Series A, Final Report. Project Vista.

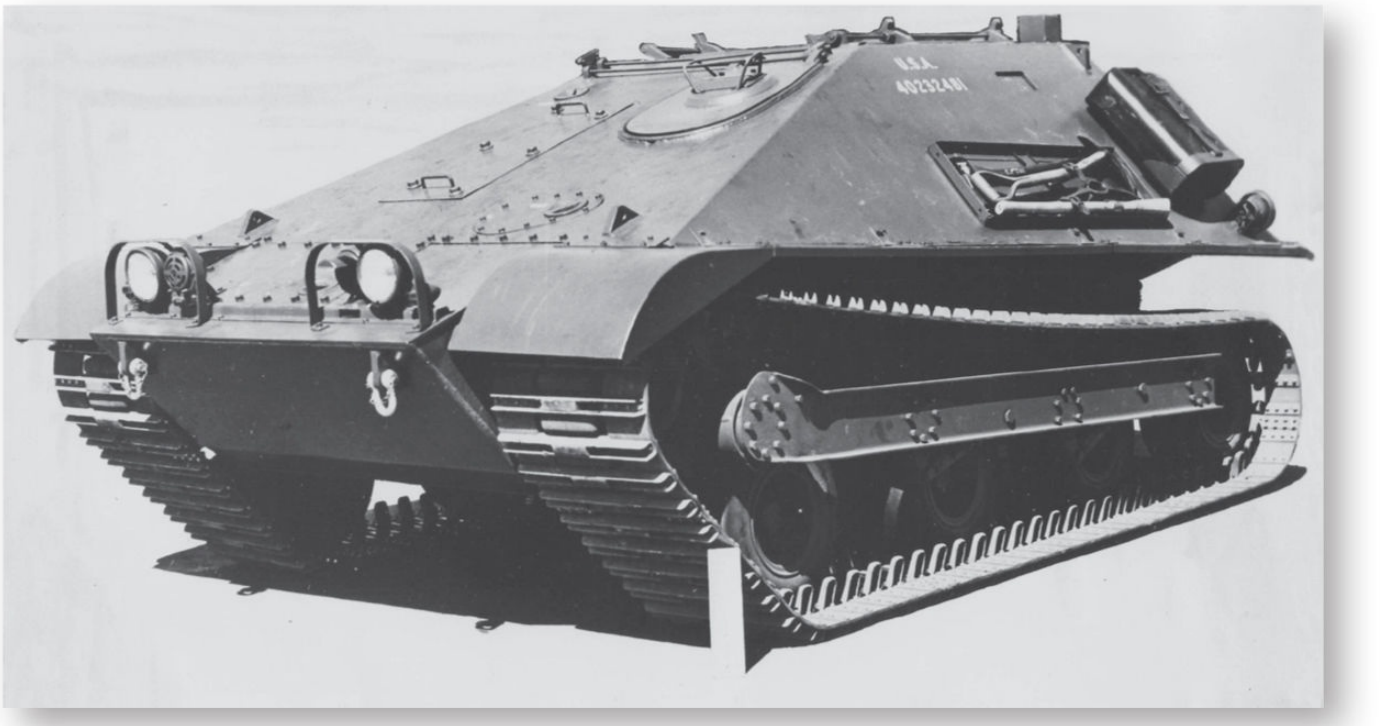
The key point in the Field Forces Group analysis was the shaped-charge projectile fired by a recoilless rifle, which it asserted had changed inalterably the previous gun-armor correlation. Using it, practically any armor could be penetrated by a relatively light gun, mounted on a light combat vehicle for transportation or fired from a ground mount. The group called for a reevaluation of the classic armor concepts that had stressed ever larger and heavier weapons systems that had pushed tanks beyond any reasonable cost and weight considerations.

Surprisingly, both Project Vista and Army Ordnance had hatched ideas of multiple-gun light vehicles armed with recoilless rifles, independently of each other's operations, by the end of the summer of 1951. The meeting of the Infantry Fighter with the Ontos antitank vehicle was only a matter of time. On July 20, the Detroit Arsenal hosted the Conference on Proposed Gun Infantry, Antitank, Self-Propelled, and Six-Man Personnel Carrier. Personnel attending included representatives of Ordnance, Army Field Forces, Infantry School, Armored School, Army Staff G-4, Signal Corps, and US Marine Corps.



Project Vista identified several possible variants for their Ontos antitank vehicle, this one carrying a quadruple .50-cal mount. The Detroit Arsenal was using their pneumatic road wheel suspension for most lightweight designs at this point. (US Army)

This meeting at Detroit Arsenal saw the firming of specifications. Mobility and agility was to be superior, based upon a tracked vehicle suspension. Ground pressure not greater than 4psi was desirable. On the other hand, a simple and inexpensive design was desired. The engine should be the 2½-ton truck engine (GM 302) with minimum modifications. The crew would consist of gunner, loader, and driver. In order to keep the overall weight at 12,000lb, armor would be limited to 0.5in. Pilot vehicles were desired for several variants of the basic gun and personnel carriers: six-man infantry carrier fitted with a single 105mm rifle; gun carriers each with a rotating cupola to accommodate two, four, and six guns for comparative testing; six-man personnel carrier as represented by the wooden mock-up exhibited; ten-man personnel carrier, and a lightweight gun carrier variant to weigh not more than 8,000lb and armed with a single recoilless rifle.



One of the pilot T55 six-man personnel carriers, at Aberdeen, June 8, 1952. The design was identical to the ten-man version except for slightly greater length. (US Army)

At the close of the meeting, General Beasley suggested that Detroit Arsenal begin a long-range program to fulminate new ideas. In response, it was recorded that it was already in contact with “a facility which is noted for imaginative design.” Work also continued on feasibility designs for an automatic breech mechanism for the recoilless rifles.

On August 16, Project Vista personnel sent the Chief of Ordnance a series of questions on topics under study. One scientist mentioned having “heard of an armored vehicle mounting several recoilless rifles being developed by somebody. The [Field Forces] group is considering just such a device and has requested any information that we can supply on this subject.” The Ordnance chief’s assistant replied on September 11 with a report of the July 20 conference, but cautioned that its information was still tentative.

Ontos had just met Infantry Fighter.

At this point, progress accelerated. Secretary Pace and the Chief of Staff, General Collins, shifted their focus on Project Vista and its reports to the activities of Ordnance and Army Field Forces. General Clark wired the G-4 of the Army Staff on September 22 his final list of pilot vehicles required for Ontos vehicles. The G-4 ordered Ordnance to begin the Ontos Vehicles development project and Secretary Pace instructed General Collins on October 6, 1951 to assign the project the highest priority and to brief him semi-monthly on its progress.

The project formally began on October 25 with the highest priority 1A assigned. The Ontos pilot vehicles were ordered accordingly in two groups, the Infantry Assault Vehicle and the Infantry Carrier Vehicle:

Four T165 Rifle, Multiple 105mm, Self-Propelled (four or six guns)

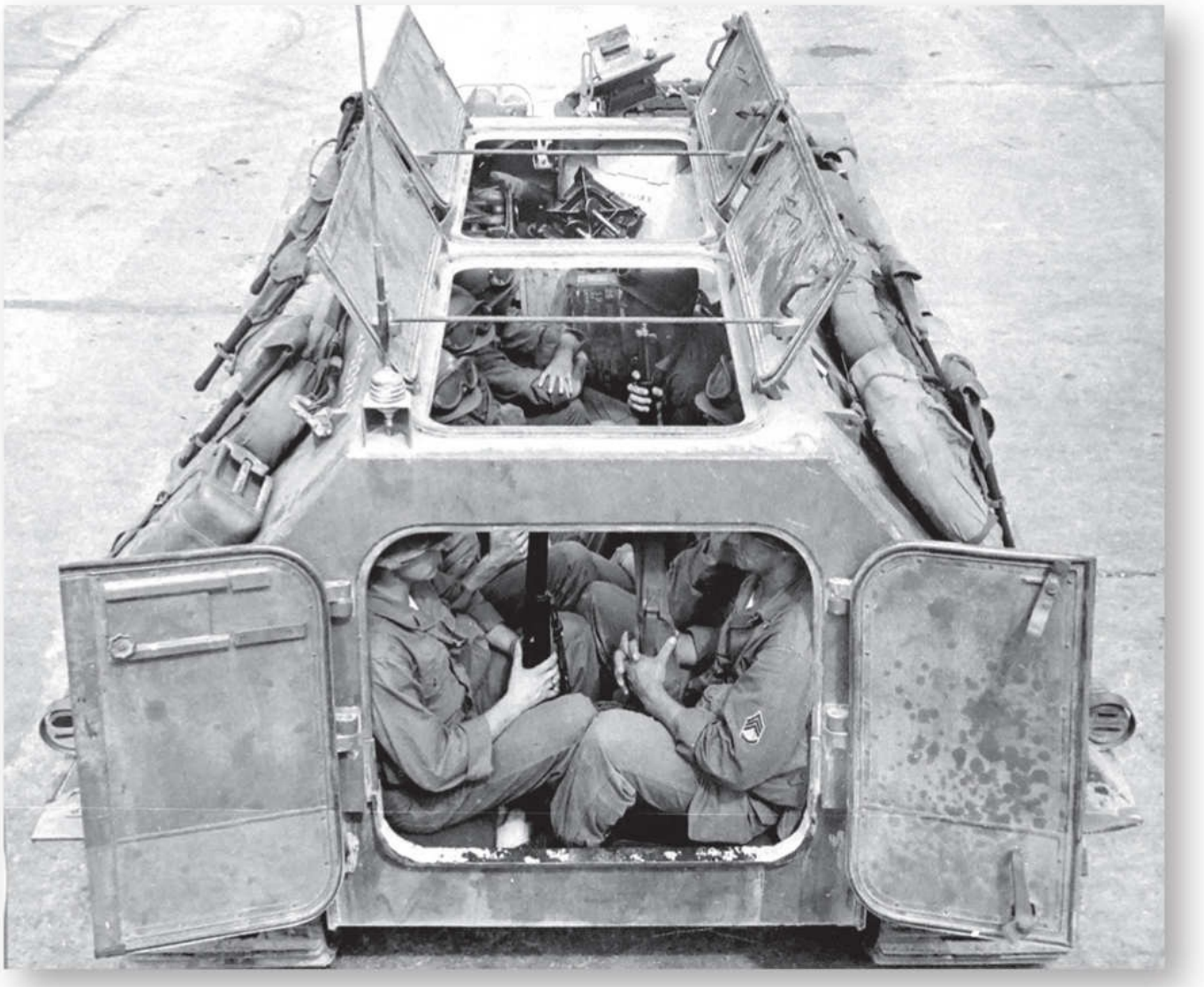
Two T166 Rifle, 105mm, Self-Propelled (single gun)

Two T167 Rifle, Multiple 105mm, Self-Propelled (eight guns)

Two T55 Utility Vehicle, Tracked, Infantry (six-man carrier)

Two T56 Utility Vehicle, Tracked, Infantry (ten-man carrier)

Allis-Chalmers was contracted by letter on October 26 for the design and delivery of the pilots. All vehicles were to be delivered by October 1952. However, the personnel carrier version of the Ontos became an early casualty of the program. The urgent requirement for a new armored personnel carrier brought a troop test at Fort Knox in September 1953 with the current T18E1 (M75) and the Ontos (T56 ten-man), T59 and T73 prototypes. The Ontos T56 was judged (not unexpectedly) as too cramped to hold mortar and rifle platoons and the troops could not get out quickly enough. The T59 of Food Machinery Corporation was judged the winner and later entered production in 1953 as the M59. It used the same GM 302 engines as the Ontos family.

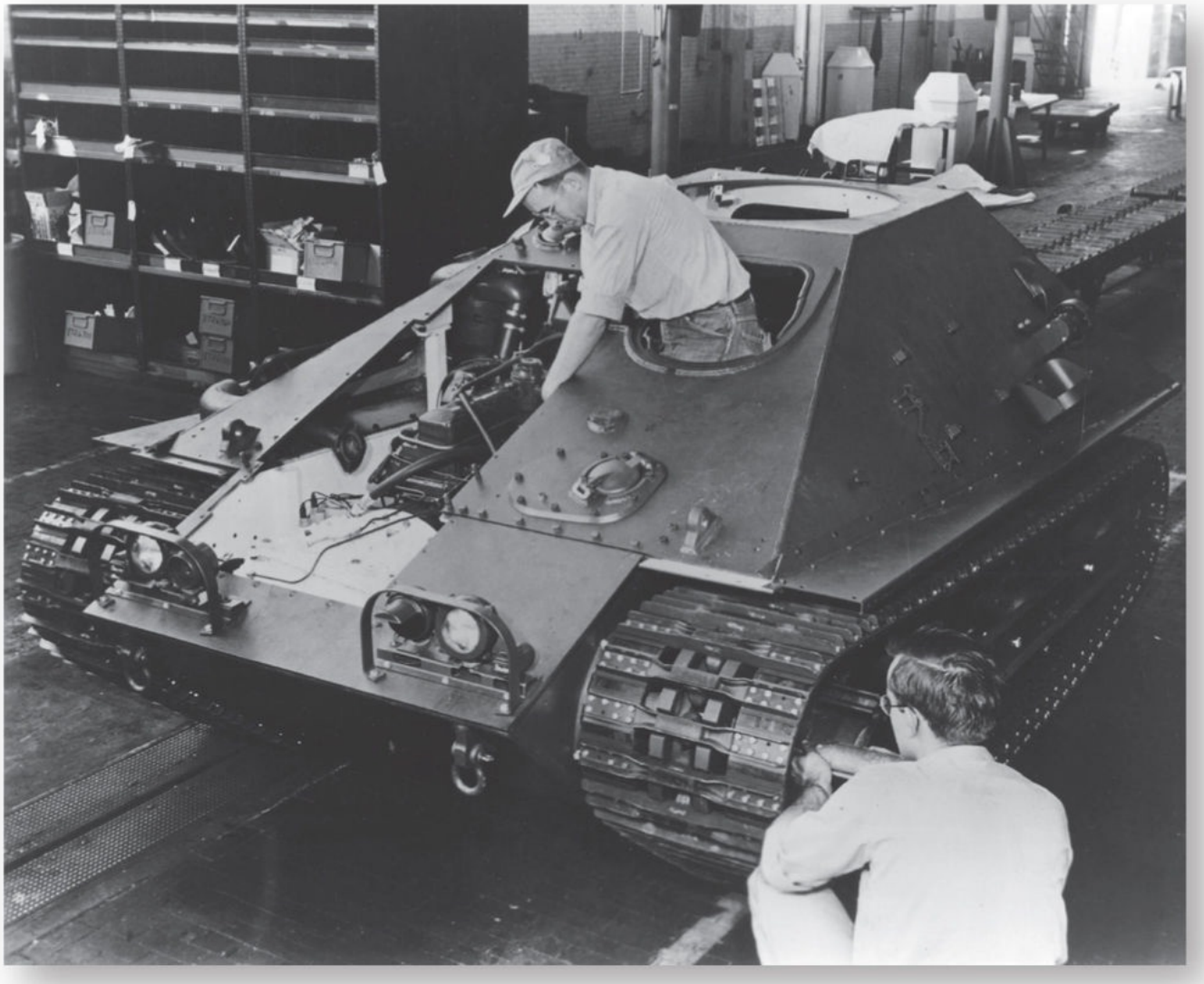


A pilot T56 ten-man personnel carrier version, demonstrating the almost inhuman quality of ergonomic standards of the day. Its rejection by Army Ground Forces in favor of the larger armored personnel carriers terminated the search for a lightweight carrier first proposed in 1950. (US Army)

Although the T56 pilots were retained for further research on utility carriers, the scope

of the Ontos program devolved upon the Infantry Assault Vehicles. Numerous changes extended the expected development period, although the six-gun T165 was determined as the base vehicle. General Collins ordered Army Field Forces to complete testing of the pilot vehicles, weapons, and ammunition, and determination of acceptance, prior to January 1, 1953. This proved infeasible and on January 19, nine of the pilots and 15 new vehicles were ordered built as T165E1 vehicles. This decision followed the designation of the T165E1 that would carry a new recoilless rifle and receive upgrades to the suspension.

The M27 recoilless rifle carried in the Ontos pilots had been developed during the Korean War, achieving the initial requirements for reliable accuracy to 1,000 yards distance with a high-explosive antitank (HEAT) warhead capable of destroying the heaviest armored vehicles. However, further research had achieved better-than-required accuracy to a range of 2,000 yards. Thus, the development of an improved 105mm rifle continued under the Trilateral Battalion Antitank (BAT) program. By 1953, a new rifle was ready for issue, using an extended chamber and other improvements over the M27, capable of firing a more powerful fin-stabilized HEAT projectile through a rifled barrel, which also permitted firing spin-stabilized high-explosive and white phosphorous ammunition. On July 16, Ordnance classified the M40 (T170), 106mm recoilless rifle as standard and the designated weapon for the BAT program. The 106mm designation was an artificial one, designed to prevent logistical confusion with ammunition incompatible with the M27 weapon. It remains in service to this day in some armies.



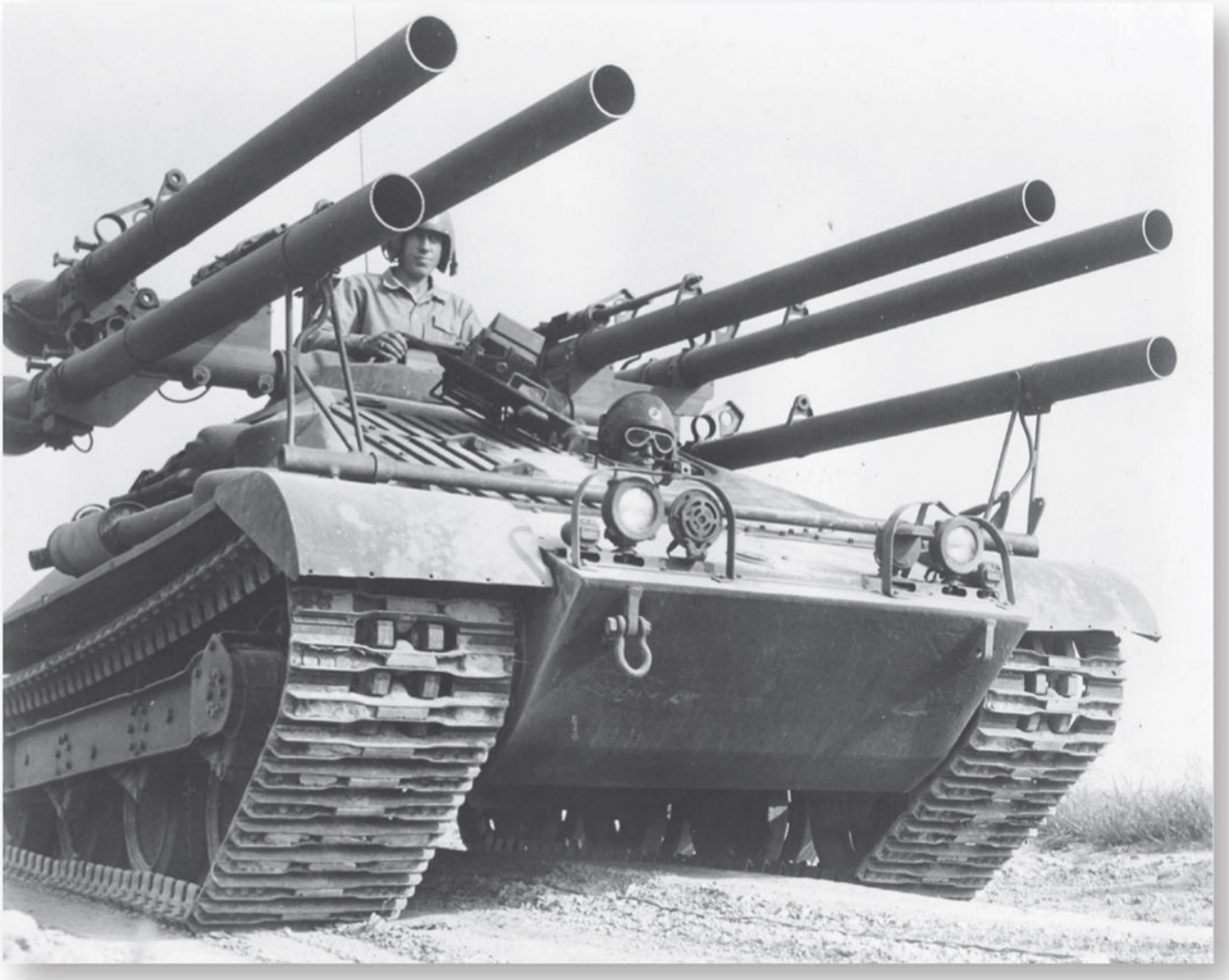
Ontos vehicle assembly line at the La Porte, Indiana plant of Allis-Chalmers Manufacturing, builder of all pilot and production vehicles of the Ontos program. (USMC)

The Army decided to modify the Ontos design to use the improved M40 rifles as a matter of course, ordering conversion of all but five of the Ontos pilot vehicles to the T165E1 configuration, applying the same to its order for 15 new pilots. Upgrades to the suspension system included new steel road wheels, paired on new track fitted with center guides. Previous versions had used single road wheels on track with end guides, but these proved unreliable during initial tests, throwing track frequently. The last of the new construction pilots would not be received until March 1954, thus delaying field testing of the Ontos antitank vehicle more than a year from what the Chief of Staff had ordered. In the meantime, the Army Field Forces held interim field testing of the converted pilots and found the lifespan of track and suspensions unsatisfactory and also listed in a report to the Army G-4 staff on October 9, 1953 the safety features and increased mechanical reliability of its fire control components required to ensure adequate test results.

The new track and suspension system was still under final engineering at Allis-Chalmers, and thus had to be reordered into yet another series designated the T165E2. On November 23, 1954 the Army ordered the 15 new construction pilots finished to this standard. The Marine Corps now took an informal lead in the program with its own field-testing program, before which the T165E2 in its hands received further modifications. On

April 9, 1954 the commandant of the Marine Corps reported that the pilots under testing had reached minimum combat acceptability in their present design with a few exceptions. The vehicles were taken in hand and had modifications applied to reinforce the suspension, install the XT-90-2 transmission to correct previous discrepancies, install a deep-water fording kit, and change the fire control system to permit component replacement in the field. On November 23, the commandant reported that, subject to some minor corrections, he considered the pilot vehicles acceptable prototypes for production. He convened a coordination meeting at his headquarters that settled final details on December 1 and indicated that the Marine Corps would place an initial order for 250 Ontos.

On March 1, 1955 the director of Army Research and Development forwarded to the Chief of Ordnance the Continental Army Command (successor to Army Field Forces) final report on testing of the T165E2 Ontos, which found the vehicle “unsuitable for use by field forces.” The report stated that in service tests of these weapon systems, the vehicles were found to be unsuitable for use as BAT weapons carriers within an infantry battalion. While the Ontos vehicle provided the necessary armor protection and fully tracked cross-country mobility, it had the disadvantages of mechanical unreliability, reduced accuracy, increased weight, inadequate space for crew and ammunition, and limited protection afforded by armor when recoilless rifles were reloaded from outside the vehicle. As such, the M38A1 Jeep Carrier was maintained as the interim carrier for the Rifle, 106mm, M40.



This pilot vehicle was modified and used by the Marine Corps to validate its requirement and resulted in its designation as the production prototype T165E2. The heavy air cooling louvers on the front were exchanged for a mesh type for better venting. Note the mountings for spotting rifles on all six recoilless rifles. (USMC)

What had happened? Essentially, the Army as an institution had seen the final evaluation of the T165 delayed long past the time Secretary Pace had left office. Pace himself had faced considerable opposition from General Collins and the Army Staff with the Ontos and many other aspects of Project Vista. For Collins, the Ontos threatened the Army's preference for the offensive over the defensive as well as the primacy of the tank. Pace wanted to move rapidly into production of the vehicle, finding it much less costly than buying more tanks, but Collins stated that until the vehicle passed proper testing that would prove most inadvisable. When General Matthew Ridgway, now Supreme Allied Commander in Europe, asked General Collins in July 1952 if the Ontos and 106mm BAT testing could be accelerated in order to provide it to NATO allies in 1953 under the Military Assistance Program, Collins refused to approve it. Ironically, Collins himself had made public statements in early 1950 in which he pronounced the tank obsolete for modern warfare, except for the lightest possible versions. He had been forced to make a turnabout with the onset of the Korean War and the tank crisis it fostered. Thereafter he would not again be found lacking in support for the tank and offensive doctrine.

The new standard M50 Ontos entered field testing by the 1st Marine Division in 1957, earning mixed reviews. The spotting rifles were standardized as a set of four, on the top row of 106mm recoilless rifles. The travel lock mechanism bracing the 106mm guns was controlled by the driver. (USMC)

In the end, Secretary Pace relented, especially when briefed that Ontos was not yet close to evaluation in January 1953 as he prepared to leave office. He did not wish to fight Collins, the staff and Army Field Forces at such a juncture.

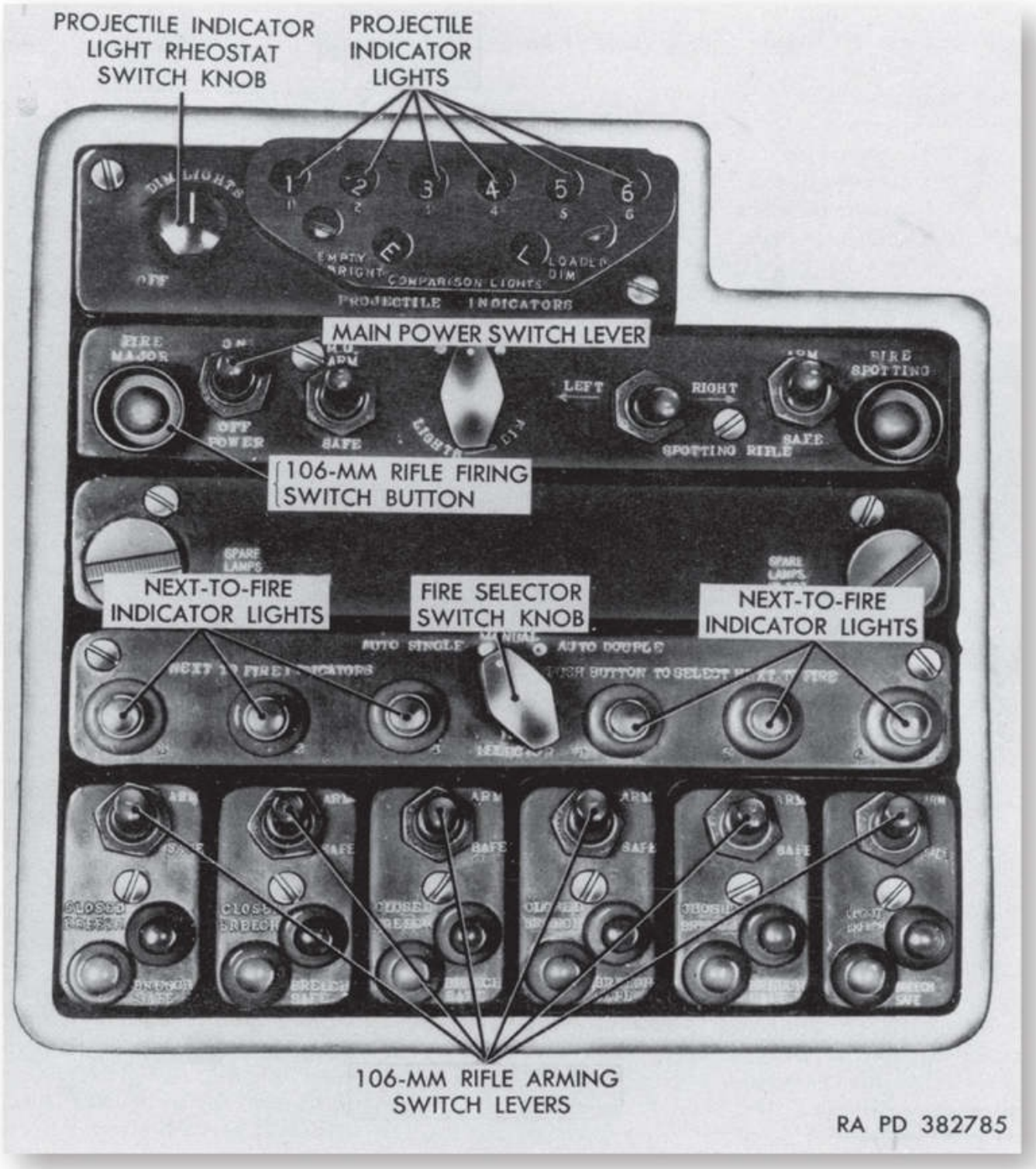
To the Army's credit, the Ontos retained its 1A priority when the annual review was published on March 2, 1953, compared to the 1B still held by its distant cousin, the M56 (T101) reviewed above. One presumes that the field testing of the improved T165E2 was fairly handled, but that there simply was no longer any institutional support for it. By 1954, it had probably evolved into too complex a vehicle to be issued to an infantry battalion compared to the BAT on a Jeep or, later, the M56. The Continental Army Command labeled the Ontos unsuitable for the field, whereas the unarmored and

uncovered M56 was accepted and later distributed to the field as somehow suited for use as an antitank and self-propelled assault gun.

The much anticipated semi-automatic loader for the Ontos, suggested as early as the Project Vista report of 1952, was finally terminated by Ordnance in mid-1956. The long search for repeating recoilless rifles dated from World War II German experiments. The US effort began in 1953 and focused on the M27 105mm rifle. Unfortunately the technical problems for obtaining rapid fire without a human reloading the gun remained unchanged: space limitation at the breech, contrasted with heavier and longer munitions, resulted in a very heavy mechanism for a weapon whose chief advantage was light weight. The T189 rifle used electric gear motors to rotate a reel containing five rounds that in sequence coupled the barrel and breechblock with a chamber containing one round.

Army Ordnance classified the Ontos as a standard type for the Marine Corps on February 10, 1955. It received the ever-awkward designation of “Rifle, Multiple, 106mm, Self-Propelled, M50.” Although funds lagged, the first 29 were bought with Fiscal Year 1956 funds and another 267 the following fiscal year, but an additional 41 had to be canceled that year leaving 296 contracted. Later years’ funding brought the total Marine Corps acquisition to 360, all from Allis-Chalmers Manufacturing. The first production vehicle was accepted by the Marine Corps on October 31, 1956. A November 1956 report from Aberdeen Proving Ground on engineering tests of the desired USMC modifications showed 30 new discrepancies and made 26 recommendations. As with all armored fighting vehicles, the Ontos had a long future ahead involving faults in design and manufacturing that would require frequent modifications.

The M50 vehicle issued to the new Marine Corps antitank organizations in 1956–58 had achieved all the objectives of the original project. A lightweight and agile vehicle, it carried a three-man crew and the gunner/commander could select and fire the six 106mm rifles singly, in pairs or a salvo of four or six guns aimed with the assistance of .50-caliber spotting rifles accurate to 1,500 yards. Beyond that range, the recoilless rifles were accurate to at least 2,000 yards using burst-on-target firing techniques with the periscope sight. Eighteen rounds of rifle ammunition were carried including those loaded in the six rifles. Two of the 106mm rifles could be dismounted on tripods for use by ground troops if desired. The shaped-charge HEAT ammunition could penetrate any known tank armor and the secondary high-explosive plastic (HEP) ammunition penetrated most armor and also provided excellent fire support for infantry units. An additional antipersonnel round was developed for the 106mm rifles in time for the Vietnam War. A .30-caliber machine gun was fitted to the turret top, capable of firing coaxially with the recoilless rifles using the interior fire controls, or as a free gun by the gunner in his turret hatch. The hull and turret was completely armored with 0.5in plate, with favorable sloping, except for the 0.25in hull floor.


PROJECTILE INDICATOR LIGHT RHEOSTAT SWITCH KNOB
PROJECTILE INDICATOR LIGHTS
MAIN POWER SWITCH LEVER
106-MM RIFLE FIRING SWITCH BUTTON
NEXT-TO-FIRE INDICATOR LIGHTS
FIRE SELECTOR SWITCH KNOB
NEXT-TO-FIRE INDICATOR LIGHTS
106-MM RIFLE ARMING SWITCH LEVERS
RA PD 382785

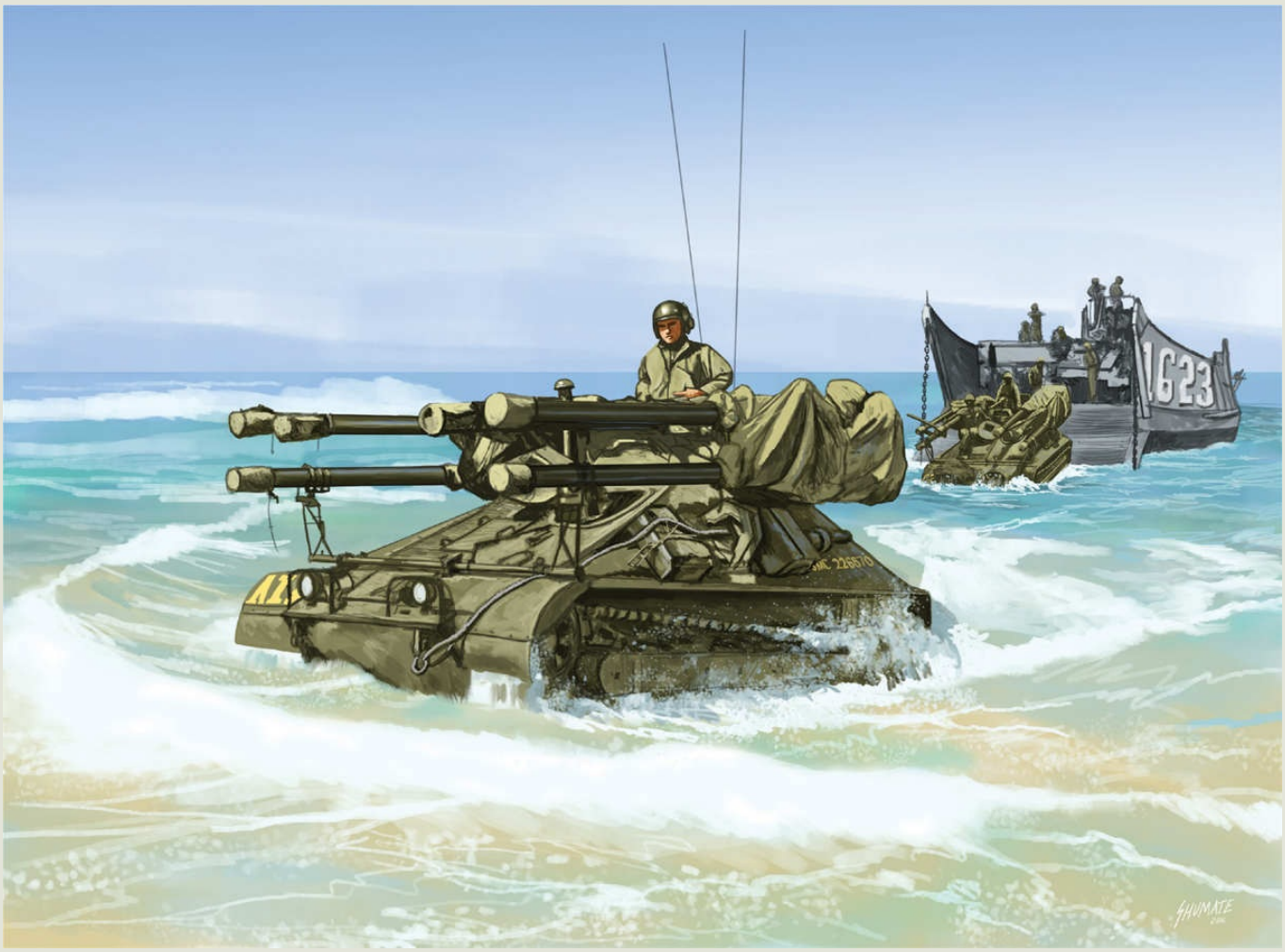
The Weapons Control Panel of the Ontos permitted the arming and rapid firing of sequential single shots or paired rifles or a simultaneous salvo of up to all six. The firing of the spotting rifles was controlled on the panel's second level, right side. The spotting rifles of the outboard rifles were not controlled here, because they were reserved for dismounted use. (USMC)

The firepower manipulated by a single gunner in the M50 depended upon a unique and sophisticated T149E5 gun mount system of several subsystems. The traversing and elevating handwheels permit smooth and accurate manipulation of the turret in two axes, with firing buttons incorporated in the elevation handwheel grip. The two weapons cradles for three recoilless rifles each contain their hydraulic breech devices, electrical firing solenoids and four spotting rifles. The hydraulic breech mechanisms permit the movement

of the breech between safe [semi-open] and closed positions from inside the vehicle. The electrical firing solenoids permit the firing of each rifle from inside and those of numbers three and four rifles also fire the spotting rifles by the gunner from inside. Firing solenoids are replaced at will without disconnecting the wiring to the weapons control panel. At the heart of the system is the weapons control panel, manufactured by Harvey Machine Company. It consists of five removable control units fitted into an aluminum casing open to the gunner’s position. These units, from top to bottom, consist of load status displays for each rifle; power/selector/firing switches for rifles and spotting rifles; a spare light bulb container; firing sequence selector and next-to-fire indicators; and the individual arming switches/lights for each recoilless rifle.

The men selected to operate and maintain the M50 in new antitank companies and battalions organized by the Marine Corps starting in 1957 knew from the outset that they were breaking fresh ground in a unique and unusual new machine of unknown combat potential. With typical aplomb, they turned to their new tasks with enthusiasm.

B M50 ONTOS WADING ASHORE FROM ASSAULT CRAFT

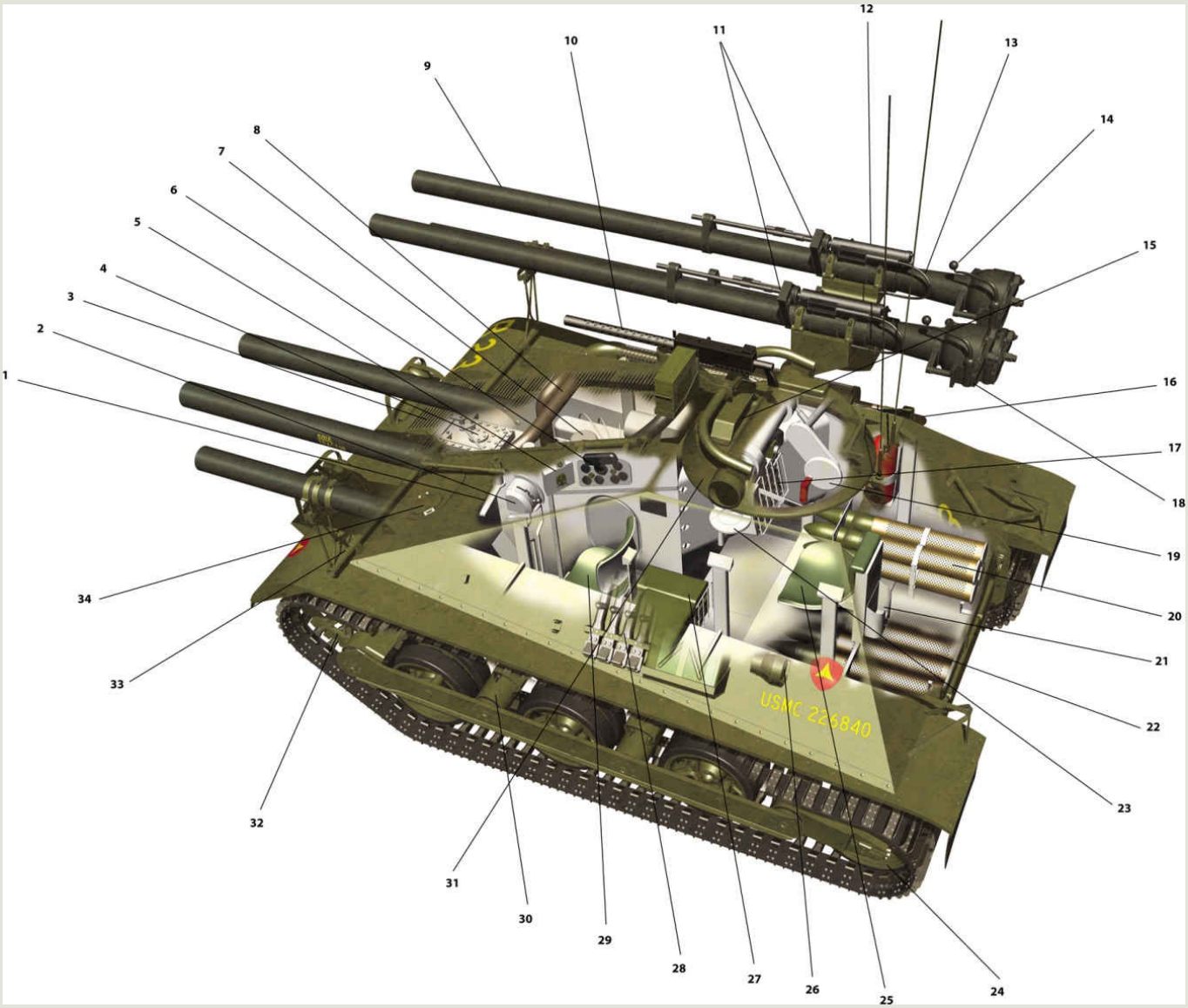


An M50 Ontos wades ashore from a Navy Landing Craft, Utility in the Pacific. The LCU-1610 class craft carried five of these vehicles in the assault, compared to two in the LCM-8 landing craft, also standard in the US Navy amphibious force of the 1950s. Just as was the case for the M56 for Army airborne operations, the Marine Corps counted upon landing the M50 early in the assault waves, just after the tanks, in order to secure the landing beaches from any armored counterattack.

The vehicle operates with the deepwater fording kit installed, which included an intake tube over the engine compartment and an exhaust extension hose carrying the engine gasses to discharge over the rear door. The kit raised the fording capability from 24in to 60in. The M50 and M50A1 had the same external appearance, except that the engine and transmission cooling grillwork does not extend below the bar of the gun travel lock bracing and the engine access door is solid compared to the M50A1 that appears in other plates.

Tactical markings show this to be a vehicle of 1st Platoon, A Company, 1st Antitank Battalion.

C M50A1 ONTOS



The M50A1 shows the culmination of over a decade of almost continuous modifications and redesigns since the first T165 pilot vehicle rolled off the Allis-Chalmers production line. The final improvements reflected in this particular vehicle included the new Chrysler V-8 engine (25 percent more hp), XT-90-5 transmission, improved suspension components, and an azimuth scale on the turret race useful for range card and indirect firing.

KEY

1. Travel lock handle

2. Steering levers, shifting and starting lever

3. Transmission louver

4. Allison XT-90-5 transmission

5. Driver's light switches

6. Driver's instrument panel

7. Chrysler V-8 engine

8. Air intake louvers

9. M40A1C 106mm recoilless rifle

10. M1919A4 .30-caliber machine gun

11. Equipment mount for 106mm ground mount

12. M8C .50-caliber spotting rifle

13. Firing cable, spotting rifle

14. Breechblock operating lever (closed position)

15. Gunner periscope sight M20A3G

16. Engine exhaust tailpipe

17. Weapons control panel

18. Breech actuator hydraulic system (not visible)

19. Elevation handwheel, firing button

20. Four 106mm rounds (on deck)

21. Binocular rack

22. Eight 106mm rounds (under deck)

23. Traversing handwheel

24. Rear supporting arm, road wheel

25. Gunner seat

26. Left tail light

27. AN/VRC-8 radio

28. Spare track

29. Driver seat

30. Road wheel supporting arm hub

31. 106mm rifle mount T149E5

32. Final drive, sprocket wheel

33. Travel lock (engaged)

34. Fuel inlet, fuel pump cover

SPECIFICATIONS

M50 Ontos	
Crew:	Three
Combat weight:	8,660kg (19,050lb)
Overall length:	151in
Width:	122.25in
Height:	86in
Engine:	General Motors 302 in-line six-cylinder liquid-cooled 145 gross hp; M50A1: Chrysler V-8 liquid-cooled HT-361-318 180 gross hp
Transmission:	Allison XT-90-2; M50A1: XT-90-5
Suspension:	Torsilastic, eight dual road wheels
Track:	T123 Band, center and outside guides, 20in wide
Fuel capacity:	47 gallons (gasoline)
Max speed (road):	30mph
Max range:	125 miles; M50A1: 100 miles
Obstacle clearance:	28in vertical, 54in ditch
Minimum turning circle:	18ft
Fording depth:	24in, 60in with deepwater kit
Ground clearance:	15in
Armament:	Six 106mm rifles, M40A1C: one .30-cal machine gun M1919A4: four .50-cal spotting rifles M8C
Fire control:	Manual traverse/elevation; Harvey Weapons Control Panel; periscope sight M20A3
Main gun ammunition:	18 rounds HEAT, HEP, antipersonnel (APERS); 80 rounds .50-cal; 1,000 rounds .30-cal
Gun elevation/depression:	+20 to -10 degrees

Turret traverse:	40 degrees right, left
Armor:	Hull and turret 13mm (0.5in) Hull floor 6mm (0.25in)

M56 Scorpion

Crew:	Four
Combat weight:	7,031kg (15,500lb)
Overall length:	229.8in (gun in traveling position)
Width:	101.3in
Height:	78.9in
Engine:	Continental AOI-402-5 six-cylinder opposed air-cooled fuel injection (200 gross hp)
Transmission:	Allison CD-150-4
Suspension:	Eight torsion bars, eight pneumatic road wheels (75psi)
Track:	T103 Band, outside guides, 20in wide
Fuel capacity:	55 gallons (gasoline)
Max speed (road):	30mph
Max range:	140 miles
Obstacle clearance:	30in vertical, 48in ditch
Minimum turning circle:	Pivot
Fording depth:	42in, 60in with deepwater kit
Ground clearance:	15in
Armament:	One 90mm M54, four .30-cal Carbines, M1
Fire control:	Manual traverse/elevation; telescopic sight T186 (4–8x variable)
Main gun ammunition:	29 rounds 90mm
Gun elevation/depression:	+15 to -10 degrees
Turret traverse:	30 degrees right, left
Armor:	None

OPERATIONAL HISTORY

The M50 Ontos

The Marine Corps wasted little time in fielding the Ontos vehicles, even as they were just coming off the assembly line. The Marine Corps divisions of the Fleet Marine Force (FMF – combat forces assigned for operations with the Navy's fleets) had changed little in organization since the Korean War, and the antitank companies of the infantry regiments still consisted of two platoons with recoilless rifles and a platoon of the standard medium tank, the last remaining on paper except in wartime. While the recoilless rifles had improved with the introduction of the M27 (105mm) and the latest M40 (106mm), there remained little to no satisfaction with the medium tank in an all-infantry regiment. During the Korean War, these had relied of necessity upon the divisional tank battalion which alone had the support personnel and infrastructure to keep them operational. The limited off-road maneuverability of the medium tanks hardly matched that of the all-terrain light infantrymen of the rifle companies of the regiments.

In addition, the Corps had begun to modernize for future warfare in a similar vein to the modernization of the Army in the mid-1950s. Marine Corps leadership saw in the helicopter the ideal mobility for its largely infantry operating forces (three active and one reserve divisions). The helicopter had matured sufficiently as a technological development, such that Marine Corps planners looked to it to solve most of the traditional mobility concerns of the Fleet Marine Force. Study groups at Quantico since the late 1940s had forecast great potential for the helicopter in the landing force and by the mid-1950s were ready to assume that new models would lift artillery and prime movers ashore. Neither the performance nor the numbers of helicopters sufficient for an all-helo "vertical assault" would ever materialize, but the conceptual seeds were sown. The commandant, General Randolph McCall Pate, instructed the 1956 FMF Organization and Composition Board that:

> The helicopter will become the primary means of achieving tactical surprise and flexibility. However, surface landing craft and land vehicles will continue to be the primary means of mobility at the objective until sufficient helicopters of improved capability … are available to permit the landing, tactical maneuver and logistic support of all assault elements of a Marine Division. As the helicopter capability increases, the need for surface landing craft and land vehicles will decrease.

This publicity photo, taken at Camp Lejeune, North Carolina on May 21, 1957, shows tank-infantry training with the new M50 Ontos of 2nd Antitank Battalion and a M67A1 flame tank from 2nd Tank Battalion. The M50 crew wears infantry helmets because an intercom was not installed in the vehicles until a later modification in 1958. (USMC)

The board responded by recommending the reduction of the division in size and equipment to at least gain full strategic air-transportability in cargo aircraft, and configuring the infantry battalions for helicopter-borne vertical assault tactics. Pate ordered the reorganization in January 1957, placing all tracked vehicles (except the new and unproven Ontos), the heavy artillery, and much of the transportation and engineering equipment of the Marine Corps division into the corps-level Force Troops, replacing some of the remaining artillery howitzers with heavy mortars, and realigning personnel in the infantry regiments.

A two-vehicle section of M50s from 1st Antitank Battalion displays for inspection all associated equipment and ordnance, including the two ground tripods that could not be carried on the vehicle for the two primary dismountable 106mm rifles, which also have their infantry sights and controls mounted on the outboard upper guns. (USMC)

Into this new and austere combat organization came the M50 Ontos. The 1st Marine Division, scheduled to field test the 1957 reorganization, became the first to form Ontos companies, initially by taking the former antitank companies (disbanded after December 20, 1957) of each infantry regiment for personnel and training them as three antitank companies of 15 M50 vehicles each, over which a new divisional antitank battalion would be organized (April 12, 1957).

The Corps activated its three active antitank (AT) battalions by January 12, 1958, the 3rd AT Battalion on Okinawa being the last. Later the Marine Corps Reserve combined its AT companies into the 4th AT Battalion, and a 5th AT Battalion was activated along with its parent division during the Vietnam War, on July 29, 1966. At that point, a maximum 170 Ontos were in the hands of the units, of the 352 that existed (a few losses had occurred), but the 5th Battalion had only two companies and the reserve battalion only a few training vehicles on each site.

With the organization of the divisional antitank battalions, the division commander could wield a powerful force in something of the sense that the Project Vista scientists had envisioned for the Ontos. The much-feared interruption of an amphibious operation by an enemy armored division could be countered not by the defenses of the individual infantry battalions, but by deploying across that armored division's avenues of approach an antitank battalion's 45 vehicles and 270 106mm rifles, carrying a total of 810 rounds of lethal armor-defeating projectiles. Of course, combat is a much more complex situation than a simple weapon-for-weapon exchange, but the former weakness of the Marine Corps in this situation at last had been answered.

In reality, the antitank battalions of the divisions usually assigned their line companies direct support to each infantry regiment when the division took to the field. In similar fashion, the companies rarely operated as a single entity in the field and instead assigned a platoon of five M50s in direct support to each infantry battalion. The distinction between direct support and attachment as missions was crucial, because infantry formations lacked the logistic support, especially the maintenance echelon, for these machines. A platoon mechanic traveled with each platoon, but such a measure scarcely sufficed to do more than perform operational checks to the vehicles and assist in their upkeep by the crews.

A loader works rapidly at a Quantico test site to load the 106mm rifles, the standard being two minutes for all six. Note the hydraulic tubes connected to the breech closing mechanisms, permitting the gunner to close the weapon from safe half-lock to fully closed arming position. (USMC)

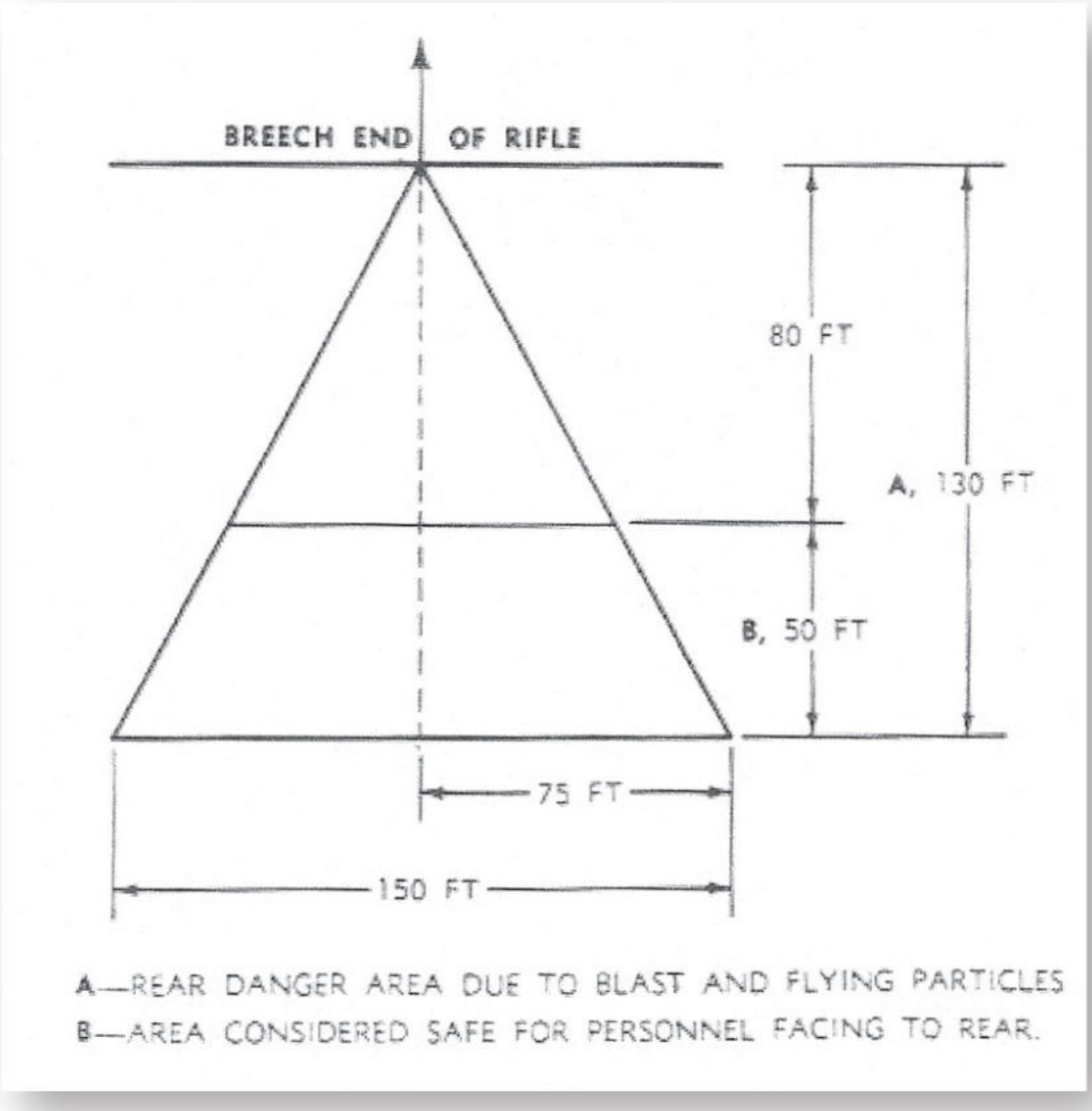
Although the M50 Ontos was armored against small arms and near-miss artillery fragments, they could not survive well against opposing tanks. In the offensive against an enemy possessing tanks, Marine Corps tanks assigned to the division or regiment would lead the movements to contact, with the antitank platoons covering the flanks of the advance from successive positions. In the defense, the friendly tanks would remain covered in reserve, while the antitank units defended approaches into the division and regiment positions from hides and ambush positions. Ontos tactics called for primary and multiple alternate firing positions to be prepared, from which several vehicles could fire in mutual support upon approaching enemy armor. The backblast from their recoilless rifles almost always revealed their positions, therefore a shift to the alternate firing positions usually was required. In addition at least one supplementary position was required, in case the enemy attack came from an otherwise unguarded direction.

A night photo of an M50 firing only two of its six 106mm rifles demonstrates clearly the power and effect of the gun's backblast. (USMC)

Attacks against the friendly positions by enemy armor could also be spoiled by the use of Ontos in ambush positions, provided they would have time to fall back into their defense positions after springing the ambush.

The infamous backblast of the recoilless rifles placed limitations upon the antitank units beyond simply uncovering their positions. There could be no use of enclosed structures or caves as firing positions, and friendly troops could not be deployed anywhere near the rear of the Ontos.

The below chart depicts the associated danger area of a single 106mm recoilless rifle, not that of an M50 Ontos firing or salvoing all six of its rifles! For that, the danger area became 100ft behind and up to 350ft wide at the base.


BREECH END OF RIFLE
80 FT
A, 130 FT
B, 50 FT
75 FT
150 FT
A—REAR DANGER AREA DUE TO BLAST AND FLYING PARTICLES
B—AREA CONSIDERED SAFE FOR PERSONNEL FACING TO REAR.

Technical schematic of the backblast generated by a single shot by the 106mm recoilless rifle. (USMC)

Operation of the Ontos was simplicity itself, with the steering, sighting, and spotting devices designed to minimize the training demands usually associated with armored fighting vehicles. At first, the design included no intercom for the crew. The “night-fighting” capability installed later in the M50A1 consisted of a quadrant and azimuth indicator to permit range-card firing. The spotting rifle tracers burned out at 1,500 yards, hence extended range firing was by burst-on-target technique. After firing the six rifles, the loader had to reload each rifle from outside the vehicle, at a halt, from the external ammunition stowage, under the rear of the vehicle. It was believed that this task could be accomplished in two minutes! The limited traverse (40 degrees to each side, elevation -10/+20 degrees), light armor, and telltale backblast of the rifles forced the Ontos crews to train to fight in ‘shoot and scoot’ style and from the ambush as a preference.

Publicity photo by 1st Antitank Battalion, taken in 1958, showing a complete antitank company on line, 15 M50 Ontos. (USMC)

The 1st Marine Division conducted the field trials of the new divisional reorganization, reporting results in June 1957. The addition of a fourth rifle company and a complete (footmobile) reconnaissance battalion scored well with the evaluators, but in their view artillery remained weak in counterbattery potential and the antitank firepower had improved only for "the initial encounter." In particular it was held that "…the mortality rate of the Ontos is still an unknown and highly critical factor … The armored shock power of the division is negligible."

Doubts continued well into the 1960s, however, and criticism of the M50 Ontos increased with an unusually poor provisioning of spares upon introduction and the quartermasters initially admitted a total lack of repair parts in the FMF. Moreover, the effectiveness of the 106mm recoilless rifle as a tank killer looked inferior compared to the first generation of antitank guided missiles then entering service. Even the Marine Corps Reserve saw inadequacies, as only two Ontos per company were provided as training vehicles.

The three-man crew of the M50 found themselves at close quarters within the vehicle, and at first there was no seat provided for the loader. Such a crew size had been proposed initially for the M56 Scorpion, but the vehicle commander was added to the crew before production began. Yet Ontos spared no interior space and the platoon mechanic assigned

by the company, for instance, would usually ride on the front of an M50, to the right of the driver's hatch.

This M50 landed across the beach near Beirut, Lebanon on July 16, 1958, as part of the intervention force. The platoon mechanic perches nonchalantly on the right fender, there being no other way to ride ashore with his unit. Canvas covers at both ends of the 106mm rifles protect from salt spray during the landing. (USMC)

ANTITANK PLATOON HEADQUARTERS:

One M50:

- Platoon Leader (LT)
- Platoon Sgt (E-6)
- Radio operator (E-3)
- Driver (E-3)
- Ontos gunner, driver, loader as below

Two Ontos sections:

- 2x M50s each 2x Gunner (E-5/4)
- 2x Driver (E-3)
- 2x Loader (E-1)

All crewmen held the occupational specialty of Ontos crewmen, but were trained on-the-job in the battalion. Tracked vehicle maintenance men received an additional course in the Ontos at the Tracked Vehicle School, Camp Pendleton. The officers were all infantry officers, although the executive officers of the battalion and companies were to be tank officers by occupational specialty. In the end, USMC tank officers served from time to time in all command positions in the antitank battalions.

The gunner/vehicle commander sat forward in the fighting compartment, centered under

the turret with an overhead hatch for observation, egress, and manual operation of the machine gun. His seat had a rigid back but variable height. He manipulated the turret controls, operated all weapons and two radios [AN/VRC-8 and AN/PRC-10], and at the same time directed his driver to maneuver the vehicle as required.

The driver sat forward, next to the engine, separated by a firewall. To his front were conventional switches and gauges for the lights, engine, and transmission. When the hatch was closed, the driver used a movable periscope to guide his movements. Steering was by brake control levers to change direction and the transmission lever provided selection of three forward speed ranges and one in reverse.

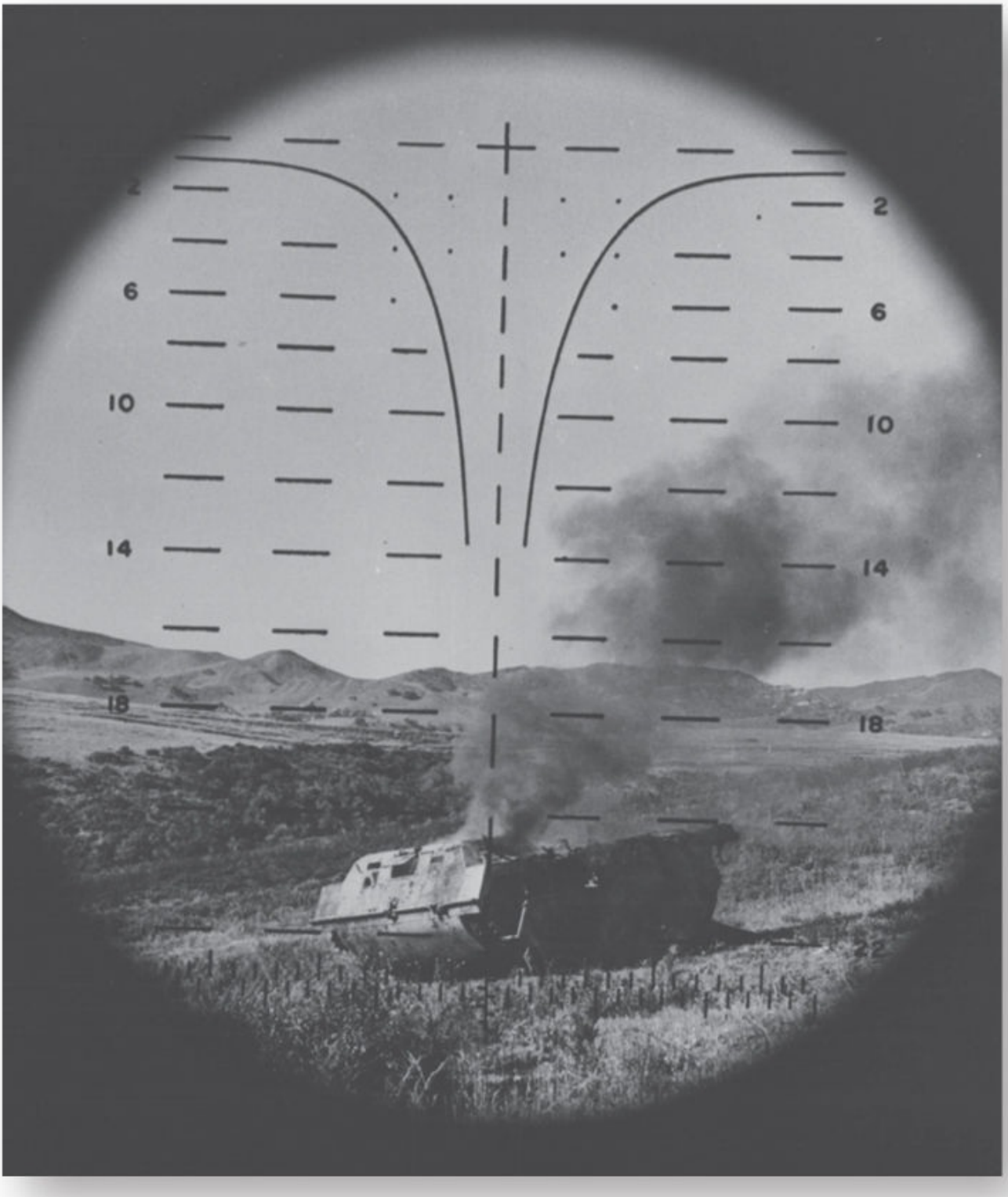
The loader eventually had a seat pad furnished allowing him to sit athwart the deck in front of the rear door. He had no vision devices, nor any specific duties inside the vehicle.

The Ontos engaged an enemy target by seeking an advantageous firing position, after which all the crucial tasks depended upon the skill of the vehicle commander/gunner. Using his periscope sights [unity window and 6x ballistic sight] he identified the target(s) to be fired upon, and commenced tracking them using the elevation and traversing wheels. He then set up his weapons, using the weapons control panel to arm the rifles to be used, and the firing sequence of single, pair, or all together. Once ready to open fire, he had to align his reticles according to the estimated range to target and lead interval (if a moving target). He then began to fire his .50-caliber spotting rifles to obtain the necessary corrections to his estimates, then (having tracked the moving target continuously) he pressed his firing button on the control panel or the elevation handwheel. Upon obtaining a hit, the gunner reengaged another target, in the same sequence, except the spotting rifles would not be necessary if the new target was at the same range. The gunner’s sequence selection on the control panel allowed him to cycle automatically through all six rifles with single shots, three pairs, or any number manually to include all together. Once all rifles had been fired, the commander/gunner had to direct his vehicle and crew to a new position to rearm and then reenter the fight. The commander/gunner also had sole responsibility for operating and firing the .30-caliber machine gun either from inside with the periscope sight and a foot pedal or the elevation handle trigger, or manually as a free gun from the open hatch. This gun became most important if enemy infantry threatened the M50s in their isolated ambush positions, for instance.

Close-up view of the M50 vehicle commander in his turret, flanked by the 106mm recoilless rifles, their spotting rifles and handling the M1919A4 light machine gun as a free gun. Otherwise, it was boresighted parallel to the larger weapons and could be fired from inside, using the periscope sights. (USMC)

Although the specific actions of the commander/gunner may appear simple enough, the sequential actions of engaging, especially against multiple targets, constituted a significant workload.

Outside of training and maneuvers in the United States, the principal operations of the Ontos units were those of individual platoons attached to Marine Corps battalion landing teams (BLT) for peacetime duty as forward-deployed landing forces of the US Navy's fleets, chiefly in the Western Pacific, Mediterranean, and Caribbean. Of these, the most significant were the US intervention in two civil wars, the Lebanon Crisis of 1958 and the Dominican Republic in 1965.



The commander's view through the 6x periscope sight for the 106mm rifle, on the tank/antitank range at Camp Pendleton. Judging from the stadia lines at the top, the burning amphibious tractor target lies at pointblank range, or 200m. The lead lines to each side of the crosshair represent increments of 5mph, each line or space. (USMC)

The Lebanon Crisis saw successive battalion landing teams of the Sixth Fleet landing at Beirut to stabilize a tottering national government and threatening international tensions. BLTs 2/2 and 3/6 landed on July 15–16 under the command of Brigadier General Sidney Wade, commanding the 2nd Provisional Marine Force. After securing the airport, he led an armored column of tanks, amphibian tractors loaded with infantry, and Ontos into the city to take control of the port area and bridges over the Beirut River, and to guard the US

embassy complex. The Lebanese Army cooperated with Wade and no fighting occurred. After BLT 1/8 arrived and landed as reinforcement, the 2nd Force counted on an array of 15 M48 tanks, ten Ontos, and 31 LVTP5 amtracs for armored vehicle support. Until July 27 and the arrival of an Army medium tank battalion from Germany, these vehicles alone performed the security and armored patrols. The withdrawal of the Marine Corps units began on August 14.

A platoon of M50s disembarks from a landing craft, utility, on a beach in Thailand, during a 1959 amphibious exercise of the US Seventh Fleet. (USMC)

The Cuban Missile Crisis in 1962 brought a large mobilization of active and reserve Marine Corps forces. For a brief interval, the Marine Corps contemplated active operations against the Soviet Army long anticipated in its planning. Apart from the strategic weapons exchange and general war consequences which both sides dangerously threatened, the immediate prospect of an invasion of Cuba to neutralize the missile and air bases would have brought Marine Corps forces in contact with some of the 20,000 Soviet troops, including four tank battalions equipped with T-54 medium tanks as well as SU-100 tank destroyers and unspecified numbers of the primitive “Snapper” antitank missile. The deteriorating relations with Cuba had already caused the 2nd Marine Division to furnish a garrison detachment to the US Naval Base at Guantanamo, beginning in 1961. The initial tank platoon deployment there eventually led to a rotating assignment by the division for a heavy tank platoon and flame tank section, with an Ontos platoon added for good measure. Eventually, this garrison became a permanent defense force, with an organic tank platoon and Ontos platoon, a curious throwback to the World War II defense battalion.

These operations demonstrated to the Corps the continuing requirement for armored fighting vehicles, and their programs received additional scrutiny in the 1960s while continuing the doctrine of “lightness” imposed by the 1958 reorganization. At this point, the Corps undertook a 1963–64 modernization program for the Ontos, resulting in the

M50A1. The installation of a Chrysler 361B V-8 engine developing 180hp and a new track proved a sufficient automotive improvement to enable it to maintain designed speeds. This modernization also added a rear door viewport and an azimuth indicator. The Army's M551 General Sheridan program still continued under development, however, and drew Marine Corps interest as a replacement for the Ontos.

As war clouds loomed in the Western Pacific, a reprise of the Lebanon landings occurred in the Dominican Republic, and once again the Marine Corps BLTs had to land and assist in restoring order to a troubled capital city. On April 26, 1965, helicopter-borne troops of BLT 3/6, the Caribbean Ready Force of the US Second Fleet, began to land in Santo Domingo. Two days later, the platoons of tanks, amphibian tractors, and Ontos landed and an armored column joined the rest of the BLT in the city. The troops of the BLT advanced against the rebel zone in small units, sometimes subdivided down to a rifle platoon with two LVTs and a tank. Small arms fire hit around the troops, mostly from snipers, but both sides agreed to a ceasefire the same day. Rules of engagement restricted Marine Corps units from firing any weapon but infantry weapons, and 2nd Antitank Battalion later reported that not a single 106mm rifle had been fired while the Ontos units provided direct fire support to the infantry. Reinforcements from Camp Lejeune brought the remainder of a full company each of tanks, amtracs, and Ontos with the 4th Marine Expeditionary Brigade, landing on May 7. But no fighting remained of any sort and the additional armored vehicles added much to traffic congestion in the capital. Marines withdrew by June 5, leaving Army troops to complete the presence mission.

A M50A1 Ontos of 3rd AT Battalion near Cam Lo, Vietnam on November 21, 1968, accompanying C Company, 2nd Battalion, Third Marines. The track section serves as additional protection against antitank rockets. (USMC)

The M50A1, here at Aberdeen for a final testing in 1963, featured an improved suspension and a more powerful V-8 engine. Interior markings on the turret race served as an azimuth indicator permitting range card firing at night without illumination. (US Army)

The Vietnam War brought fewer shocks to US forces than had the Korean War, but once again the Marine Corps would undertake tremendous expansion. It activated the 5th Marine Division at Camp Pendleton with its constituent 5th Antitank Battalion in 1966. In all, the Corps sent two and one-third divisions to combat in Vietnam, fighting a combination campaign of pacification within the northern provinces of the Republic of Vietnam, and a more conventional border conflict against the Army of the People's Republic of Vietnam (NVA).

As the antitank units deployed to Vietnam in 1965, there was no enemy armor to be encountered. The two types of antitank weapons in the Marine Corps division were the infantry battalion's eight organic M274A5 mechanical mule-mounted 106mm rifles, and the M50A1 Ontos of the antitank battalion, both here shown on the move north of Hue, May 8, 1966. (USMC)

Tank, Ontos, and amphibious tractor companies began landing with the 9th Marine Expeditionary Brigade at Da Nang to begin the formal campaign on March 8, 1965. Within a year, the antitank battalions of the 1st and 3rd Marine divisions had arrived (March and July 1966). The 5th Antitank Battalion furnished a company to deploy with the 27th Marines to Vietnam in the summer of 1967. Unlike the Korean War, the enemy infantry in Vietnam held capable antitank weapons in the form of rocket-propelled grenades (RPG) and recoilless rifles. Full of fight and operating in infantry-favorable terrain, the NVA and their local Viet Cong (VC) auxiliaries proved their mettle on more than one occasion against Marine armored fighting vehicles and their crews.

Among the antitank units entering Vietnam in the first year was B Company, 3rd Antitank Battalion, stationed at Kaneohe Bay, Hawaii. This vehicle is on exercise with the travel lock dropped down, but is not firing as the spotting rifles are absent. The 106mm rifles were numbered clockwise as viewed from the rear. (USMC)

The Ontos proved predictably vulnerable to the principal threat of mines, but its ability to cross rice paddies with the infantry earned it some praise. However, many of these spent much of the war in static positions, guarding bridges and other vital points. It also displayed a nasty tendency for accidental firing of its recoilless rifles. That feature stemmed from too tight an adjustment of the firing cable, causing accidental release of the firing pin against the cartridge. A thorough understanding of the firing cable, sear, and trigger assemblies apparently belied the vaunted simplicity of the vehicle.

The timely procurement of an antipersonnel projectile for the recoilless rifle permitted the antitank units to support the infantry during the campaign with occasionally spectacular results. The M581 106mm APERS round contained 9,600 fléchettes that could be deployed at muzzle action similar to canister munitions or set for more distant functioning with a time fuse, such that the lethal steel darts deployed in a wide pattern just before reaching enemy formations or emplacements. Popularly dubbed “beehive” by the troops, a salvo of such rounds could literally sweep a small battlefield of living beings. The standard antitank ammunition could also destroy enemy bunkers and other field fortifications. With no enemy armor at hand, the Ontos improvised the very role of

Infantry Fighter or assault gun as once proposed by the Army development staffs in 1951.

An M50A1 of 2nd Platoon, B Company, 3rd Antitank Battalion escorts amphibious tractors and other vehicles during Operation *Deckhouse VI*, a February 1967 landing of 1st Battalion, 4th Marine Regiment from the Special Landing Force on the coast of Vietnam. (USMC)

Ontos losses proved relatively few and are not reliably recorded, many having been returned to action by support or depot repair. Logistic support proved inadequate, coming as no surprise to units long frustrated with the peacetime procurement of spares. Ontos track wore out quickly and the lack of all kinds of spare parts caused breakdowns in the field that further eroded confidence in the vehicle and its capabilities. The Marine Corps tanks fared better, by comparison, because of the Army's use of the same vehicle in the war and the eventual support available from its supply system and tank depots on Okinawa and Japan. The 1st and 3rd Antitank battalions were decommissioned in Vietnam in December 1967, their surviving A companies being attached to the constituent divisional tank battalions.

Here M50A1 and infantry cross rice paddies on a sweep near Phu Bai in 1966. The tactical marks of the Ontos show the unit to be 3rd Platoon, A Company, 3rd Antitank Battalion. Note the amount of extra water cans carried by the vehicles for the infantry. The vehicle horn, once mounted next to the right side headlight, quickly disappeared from combat vehicles in Vietnam. (USMC)

An M50A1 used for perimeter defense in the 3rd Marine Division area in February 1966 has an obsolete tank searchlight mounted. The 18in Crouse-Hinds incandescent searchlight illuminated targets out to 1,600m, and had a shuttered cover to suppress filament glow when turned off. The tanks had switched to the new infrared-capable Xenon searchlights, leaving many of these available. (USMC)

Those remaining Ontos, however, turned in outstanding performances in the twin challenges of 1968, in the battle of Hue and the siege of Khe Sanh. The battle of Hue began on January 30, 1968, when eight battalions of NVA infantry infiltrated the city and the NVA 2nd Division threatened to reinforce. The responding Marine Corps forces included tank platoons from both 1st and 3rd Tank battalions, and two Ontos platoons of A Company, 3rd Antitank Battalion. Here, with the enemy in known and observable positions, the armored vehicles gave key support to the embattled infantry and undoubtedly provided the measure of superiority. The commanders of the key Marine Corps infantry battalions fighting there differed in their opinions of each vehicle but valued the support equally. Lieutenant Colonel Ernest Cheatham, commanding 2/5, liked the Ontos for its speed and agility and thought that the tanks drew too much fire. Lieutenant Colonel Robert Thompson of 1/5 preferred the tanks for their armament and staying power. Both tanks and Ontos received frequent hits by RPG and recoilless rifle rounds. Impromptu tactics worked out by infantry, with the Ontos and tank crews, facilitated the retaking of the city in the Marine Corps sectors. Several tanks went through up to five crews and remained in action. Three of the Ontos stayed knocked out of action when hit. Until the tanks received concrete piercing fuses for their high-explosive

ammunition, the 106mm antitank projectiles of the Ontos alone served in knocking down buildings and walls to facilitate the infantry advance. Both Thompson and Cheatham had to hold up their advance at times for lack of 90mm and 106mm ammunition, illustrating the essential role of their armored vehicles.

The single tank platoon and two Ontos platoons assigned to the 26th Marines during their 77-day battle of Khe Sahn (January–June 1968) provided arguably less decisive support to that embattled outpost than had occurred at Hue. However, the vehicles proved a final insurance against being overrun by the NVA sappers and infantry. The vehicles usually remained in hiding positions during the day and emerged to occupy fighting positions during the night. The commander of A Company, 3rd Antitank Battalion assumed command of the armored vehicles and the regimental mobile reaction force. He used his Ontos to patrol the lines and improvised using sleds towed by Ontos to resupply infantry units in the lines occupying exposed positions.

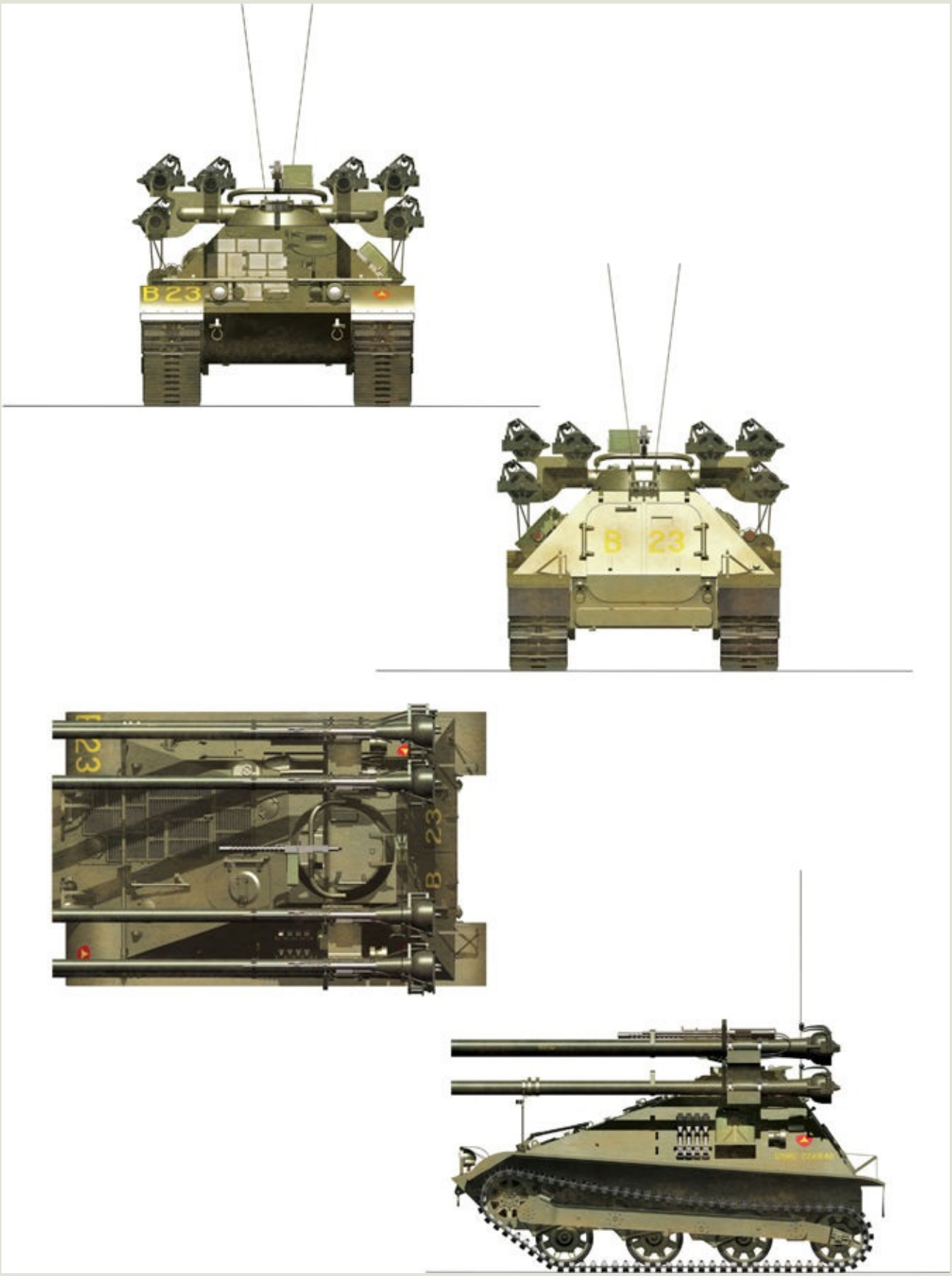
This publicity photo, dated 1967, shows an M50A1 of B Company, 1st Antitank Battalion on defensive duty at a base in southern I Corps area, perhaps Chu Lai. It is one of the earliest photos showing the replacement of the original radios with the new solid state AN/VRC-12 system. The antennae for these were mounted on the turret rear vice hull rear, and sported a thicker (automatic step tuning) antenna on the right side for the receiver/transmitter unit. They were a priority issue in Vietnam in the last years of the Marine Corps campaign in Vietnam. (USMC)

Further operations of the remaining Ontos ground to a halt as the Marine Corps began its withdrawal of forces in 1969. By 1970, time had caught up with the Ontos, and the 2nd Antitank Battalion dissolved in 1971. The Marine Corps had already ordered the new generation of antitank guided missiles for the infantry, and these began to enter service in 1975.

The Ontos stationed with the Guantanamo garrison continued to operate until April

1980, by then with only one vehicle still operational and two used for parts.

D M50A1 ONTOS



The M50 fleet of the Marine Corps was rebuilt to the M50A1 standard during 1963–65. The major identification point for the M50A1 remains the grillwork for the engine and transmission cooling system. In the M50A1, the engine access hatch is not solid but grillwork. The additional transmission cooling grill extends farther forward, past the travel lock hinge up to the right side headlights.

The replacement of the older tube-type radios with solid state VRC-12 series sets took place while the Vietnam

War was reaching its peak. These installations can be seen externally only if the antennae are visible. Their position changed from the hull rear, above the rear door, to the rear of the commander's position on the turret rear, right and left. The right side antenna was much thicker, because of its tuning system. For obvious reasons, the Ontos horn was removed soon after the Vietnam intervention began for the Marine Corps.

The vehicle shown is finished in standard USMC semi-gloss, and shows the Third Marine Division insignia on fenders and on each side to the rear. There was little consistency in these markings from year to year, including peacetime, as a survey of the available photographs will show.

The M56 Scorpion

After experiencing delays in redesigning the 90mm gun and track components, this relatively simple antitank vehicle was produced in 1958 and ready for issue to the field army. However, that army then labored under its greatest reorganization since the coming of World War II. The Pentomic Division reorganization to meet the perceived requirements for ground combat in the nuclear age first affected airborne and then the infantry divisions of the Army. In place of the usual three regiments of infantry and supporting artillery regiment, engineer, and tank battalions, the airborne and infantry divisions reorganized into five infantry battle groups, consisting of an infantry battalion headquarters, four or five rifle companies, a headquarters company, and a mortar company. The airborne divisions reorganized first, in 1956–57. Instead of the planned tank battalion (airborne) of some 47 M56s each, the airborne divisions received just 30 M56s, sufficient to fit out an assault gun platoon of six M56s in each battle group. The assault gun platoons formed in the headquarters company of the airborne battle group with the organization as shown in the box above. All enlisted personnel were heavy weapons infantrymen by occupational specialty.

During the battle of Hue, this M50A1 was out of action on February 11, 1968, perhaps for maintenance or crew rest. The guns are unloaded, and no enemy is in sight. It does show the exhaust extension, part of the fording kit not usually seen. (USMC)

ASSAULT GUN PLATOON HEADQUARTERS:

Platoon Leader (LT)

Platoon Sgt (E-7)

Radio Op (E-3)

3x Assault Gun Sections:

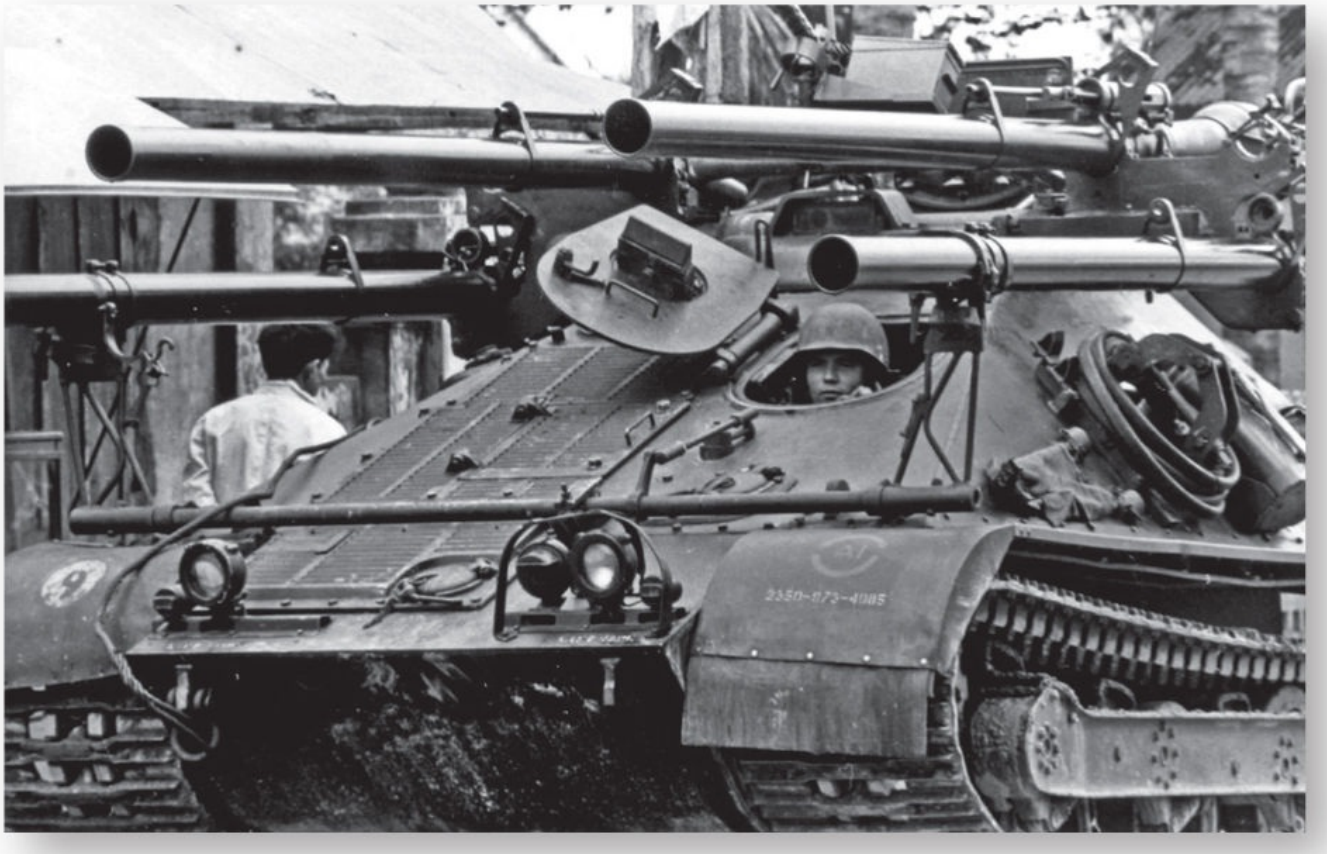
2x M56s each: Section Ldr (E-6)

Squad Ldr (E-5)

2x Gunner (E-4)

2x Driver (E-4)

2x Loader (E-3)



This Ontos, on the other hand, may be preparing for a quick-firing run along with a tank to fire on a North Vietnamese position at Hue City. Dated February 23, 1968, it shows the driver ready to move out, wearing a steel helmet vice the communications helmet, recognizing that the streets were thick with bullets. Curiously, it carries only four 106mm rifles, indicating some had received damage, or were removed to reduce projectile interference in flight. The near fender marking suggests a new issue from supply depot reserves. (USMC)

Within a few years, the evolving reorganization moved the assault gun platoon to the mortar company, now redesignated the combat support company. The Pentomic reorganization released about 100 M56s from the two airborne divisions (11th Airborne had converted to the first airmobile division of the Army in 1963) for use by regular infantry divisions and these equipped the 1st Infantry Division in Germany and the 1st Cavalry and 7th Infantry Divisions in Korea. The Army hoped to convert these into guided missile antitank platoons, but the SS-10 and ENTAC missiles remained under development too long and many of the regular divisions had to improvise with 106mm recoilless rifles on Jeeps and M47 and M48 tanks in the Army Reserve and Army National Guard divisions.

Few details have surfaced about the operations of the M56 in these battle groups. The airborne divisions at last had their previous requirement fulfilled and the organizational switch from the headquarters to the combat support company better facilitated training and operations, according to inspection reports. Given the ease of operation of the vehicle and its still-effective 90mm cannon, it simply required some measure of training and experience to handle the severe recoil of the gun, causing abrupt pitching of the vehicle partly off the ground against its rear suspension. The vehicle commander typically had to dismount to one side and aid in fire control with his spotting, because the gunner could not hold the target in his sight when the gun was fired. Above all, in airborne service, the lack of armor protection merited little criticism, because there was no armor of any sort

available in an airborne assault. It now had a serious antitank defensive weapon.

An M56 of the 101st Airborne Division engages in mock combat on April 5, 1960, during an exercise at Fort Campbell, Kentucky. The gun is empty and cartons for blank 90mm rounds are on the floor behind it. The cramped positions for the four-man crew are self-evident. (US Army)

This M56 of 1st Battle Group, 325th Airborne Infantry Regiment stands on static display at Fort Bragg, North Carolina on July 16, 1966. The loader (nearest) and the commander (head visible over gun) occupy their rather precarious bucket seats mounted on the sponson storage boxes. (US Army)

For the regular infantry, however, units made suggestions that the Scorpion's 90mm be replaced by the new 106mm recoilless rifle Battalion Antitank Weapon (BAT) in US service. Testing was accomplished in 1958–60 with the 106mm rifle, but no service conversions took place. Similarly, the M56 was evaluated as a 4.2in mortar carrier in 1960, without adoption to service.

In any case, the Pentomic Division in reality proved to be budget driven and its manifest weaknesses forced a more lasting change into the Reorganization Objective Army Division (ROAD).

Under ROAD changes, approved in April 1961, the infantry and airborne divisions received nine to ten maneuver battalions, including tank battalions, grouped by mission requirements under three infantry brigade headquarters. The infantry battalions would use the 106mm recoilless rifles mounted on ¼-ton Jeeps for organic antitank defense. This temporarily included the tank battalion (airborne) for the two airborne divisions, slated to receive the new M551 Sheridan armored reconnaissance airborne assault vehicles then under development. However, the Army staff imposed some last changes in September, ordering the tank battalion (airborne) to be equipped with the M56 until the M551s became available. The conversions of the Army regular and guard divisions to ROAD were completed by June 1965 and the 82nd and 101st Airborne divisions reported their

reorganizations complete in May and February 1964, respectively. However, their tank battalions (airborne) remained for the moment an equipment issue only, with no active organization yet assigned. Most ROAD units in the United States remained undermanned for several years to come.

Thus after about five years of operation in infantry battle groups, the number of active M56 Scorpions fell for the moment to the 47 each assigned on paper to the two airborne divisions by 1964, with no crews yet assigned. An exception came with the 1963 activation of the 173rd Airborne Brigade, forward deployed on Okinawa Island in the Far East. It received a unique separate tank company (airborne) in the form of Company D (Airborne), 16th Armor organized as shown in the box below. Commanders and vehicle crews all had the armor occupational specialty.

An assault gun platoon of the 1st Battle Group, 16th Infantry, 1st Infantry Division fords icy waters of the village of Adertshausen in the Hohenfels training area, Germany on February 2, 1961. The drivers often drove standing upright, most understandable here. The unit has changed the normal fording kit, perhaps placing the engine intake at the vehicle left rear. (US Army)

TANK BATTALION (AIRBORNE) 1963

One Headquarters and Headquarters Company

- HQ Section (three M113 APCs)
- Cavalry Platoon
- HQ Section (five Jeeps, one M113, one M106, two M56s)
- Three Scout Sections (four Jeeps)

Three Assault Gun Companies

One HQ Section (two M113 APCs)

Three Tank Platoons (five M56s)

(Redeye Section six Jeeps, five Redeye SAM Teams – added in 1964)

A test for two new items at Fort Benning on August 14, 1958; an Army H-37 heavy cargo helicopter lifts an M56 in which the 90mm gun has been replaced by a 106mm recoilless rifle. But the M56 conversion did not find favor, probably because the same rifle was carried by jeeps. (US Army)

Breaking events soon prevented any similar unit assignments for the two airborne divisions, however. Orders came to both the 82nd and 101st Airborne divisions alerting them for assignment to the US intervention in the Dominican Republic, Operation *Power Pack*, in 1965. Although only a single brigade of the 82nd actually deployed, no M56 vehicles were manned and transported there. At approximately the same time, a brigade of the 101st Airborne deployed to Vietnam, with the rest of the division following in 1967. In February 1968, a brigade of the 82nd Airborne also deployed to Vietnam. A month later, the 4th Battalion, 64th Armor joined the 82nd Airborne Division for planning purposes, although it continued to base at Fort Stewart until as late as June of 1969. This measure provided an organizational tank battalion for contingency purposes with the division. Pending the arrival of M551 Sheridans, classified standard type in 1966 but not issued because of teething problems, that battalion operated some M56s for training purposes, along with some experimental vehicles and a few M551s made available for orientation. When fully equipped with the M551 vehicles in 1969, it moved to Fort Bragg and became the 4th Battalion (Light Airborne), 64th Armor. It seems clear, however, that the 4/64th Armor never stood up as an M56 airborne tank battalion. Rather, the M56 became surplus to Army requirements, with over 700 Sheridans built by 1967.

Somewhat more attention might have been garnered for using M56s as carriers for the 4.2in heavy mortar, as shown in this 1960 photograph. The limited number of M56 chassis and their apparent value in the near future as airborne antitank vehicles probably argued against the idea. (US Army)

SEPARATE TANK COMPANY (AIRBORNE)

One HQ Section (four M113 APCs)

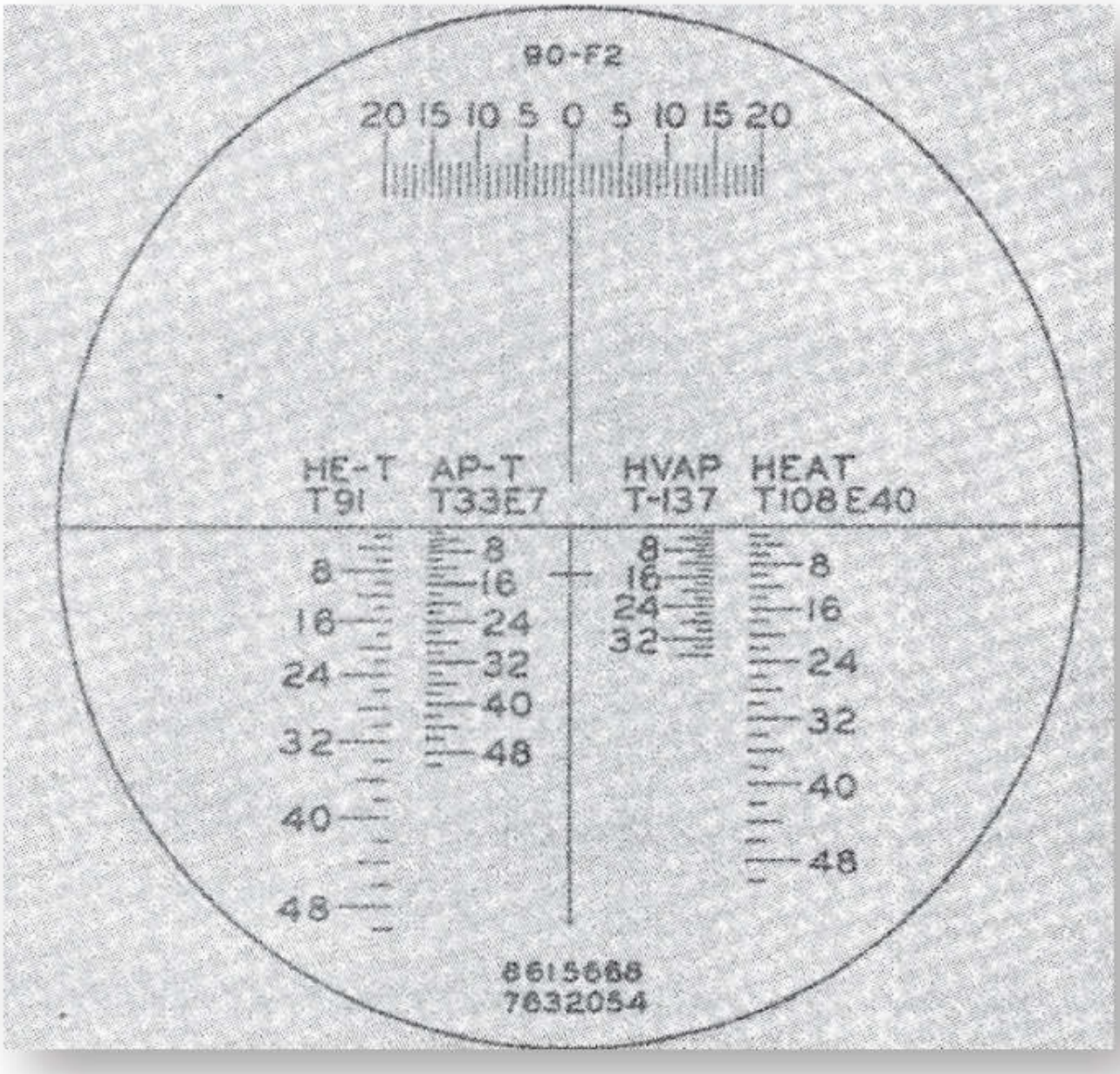
Three Tank Platoons (five M56s)

One Mortar Platoon (three 4.2in/M106s)

Operation of the vehicle and tactics used by the Scorpion units were simple and easily learned. With its cross-drive transmission, it could maneuver with the agility of a light tank, including pivoting in place. The vehicle's common automotive switches and dials, steering wheel, transmission shifting lever on the steering column, and foot pedals for throttle and braking, made driving the vehicle comparable to any light or medium truck then in service, with the advantage of excellent cross-country capabilities.

It fell to the lone M56 platoon of D Company, 16th Armor, to take the vehicle to war. Here we see in an undated photo, the classic crew drill of the M56: vehicle commander offset to spot the shots, gunner aiming, driver locking down the brakes, and loader serving the gun. (US Army)

For the gunner, the direct fire telescopic T186 provided magnification of 4x to 8x by rotating the telescope eyepiece. The traversing and elevation wheels were readily grasped to the gunner's front and left side, with the firing button part of the traversing handwheel. When the vehicle commander called out his firing command, the gunner took aim at the target through the telescope, traversing and elevating the gun to acquire the target in the crosshair reticle, then aligned the reticles for the announced ammunition at the announced range. With a ballistic reticle, the elevations required for each range and munition are easily read and applied to the sight picture of the target, aiming for the center of mass. Reference markings for leading the target up to 20mph laterally occupy the upper part of the reticle.



The all-in-one ballistic reticle for the 90mm gun showed offset range scales for four different types of ammunition. To further complicate its use, there are lead markings for moving targets placed at the top of the view. Thus, the gunner had to guess the range, align the sight picture with the range/ammo marker, and then apply some offsetting lead if the target was moving. (US Army)

Upon firing, the gunner typically relied on the vehicle commander spotting each shot, standing to one side of the vehicle with his binoculars. The jump of the vehicle usually prevented the burst-on-target technique used with other weapons. Because the vehicle was open and unarmored, the tactical position chosen was usually a hide, from which rapid firing at visible targets could continue until the targets were destroyed or enemy counter fire forced a shift of position.

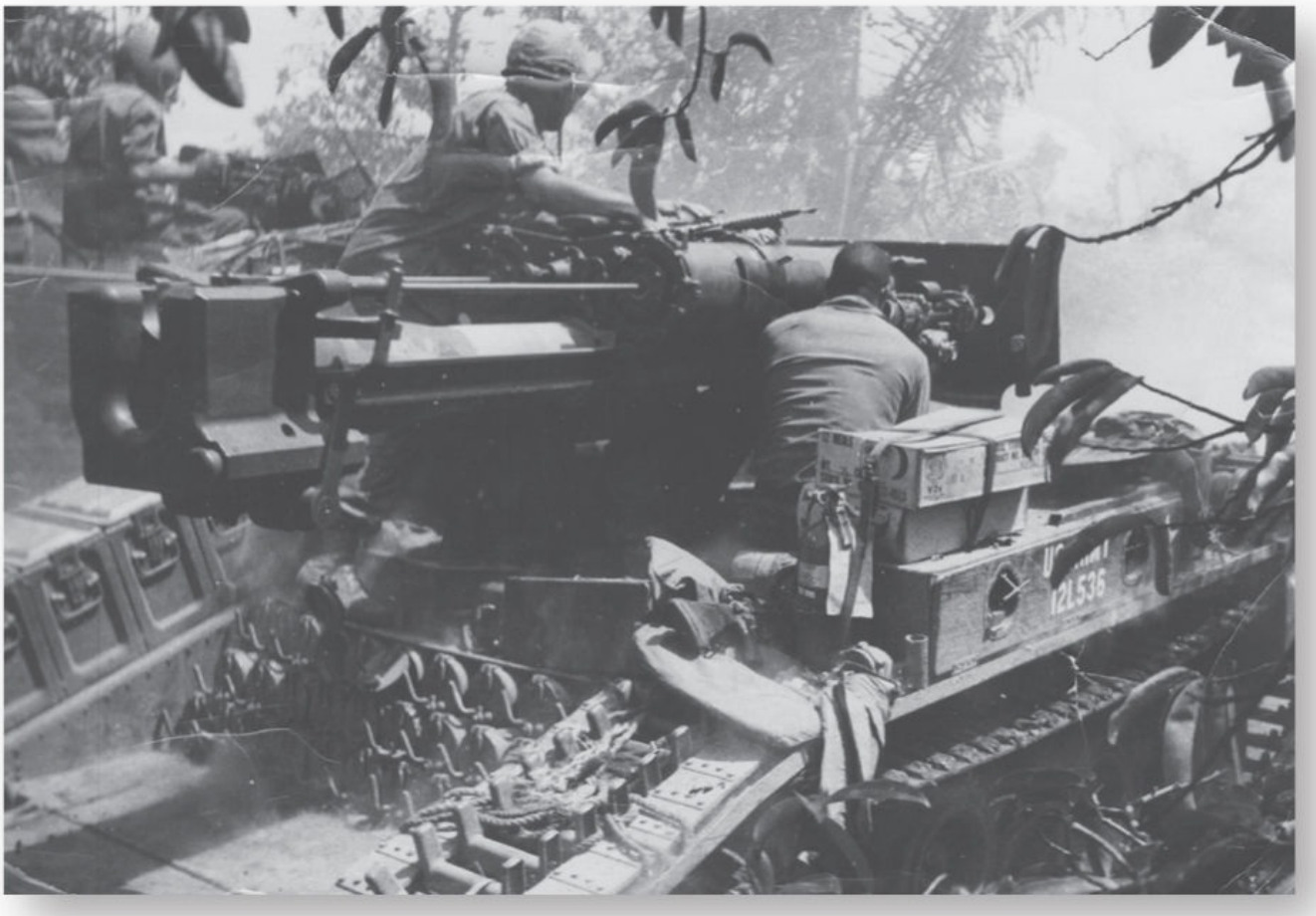
Only the driver and gunner had secure fixed seats within the vehicle chassis, and the vehicle commander and loader each perched upon seats attached to the top of the fender stowage boxes (loader) or the radio-transmitter casing (commander). While such positions allowed them to move quickly to observe targets, load the gun, and direct the gunner, they definitely forced hardships on these crewmen while the vehicle maneuvered at high speed

or over rough terrain. Both commander and loader generally stepped off the vehicle when the gun fired.

Tactics in use by M56 units depended upon the mission, whether antitank or support for the infantry. Optimum engagement range was beyond small arms range, given the vehicle's lack of armor, and concealed firing positions would be taken up to cover the advance of infantry to its objective with some use of bounding within the section or platoon in order to advance forward to more favorable positions to remain within supporting range.

In the defense, main, alternate, and supplementary positions were prepared such that the M56 could pull out of its main position when enemy fire threatened to an alternate position from which it resumed fire on the enemy, or to a supplementary position facing an entirely different avenue of approach against the defended position. As with other direct fire crew-served weapons, sections and platoons were placed where possible within mutual support, allowing more than one M56 to engage a given target. Ambush positions could be used when a position could be abandoned at will, allowing the familiar 'shoot and scoot' posture of the old Tank Destroyer Command of World War II.

Beginning a three-photo sequence of the M56 in action in June 1966: the targets were suspected enemy positions over 1,000m away. The gun is loaded and some M113s from other platoons come close to support the M56 in case the enemy directs small arms fire at them. (US Army)



The recoil motion of the 90mm in the M56 extended as much as 48in. In the photo, the gunner is trying to see the fall of his shot, while others observe. The recoil has not finished, however, because the breech has not yet opened for the ejection of the spent casing. Firing high-explosive and canister rounds made for much less recoil action than did the more powerful armor piercing and high-explosive antitank rounds. (US Army)

Ultimately, the suitability of the M56 in combat was barely tested. The sole combat use took place with Company D, 16th Armor and its deployment to Vietnam with its parent 173rd Airborne Brigade on May 5, 1965. During its warning and preparation stage prior to deployment, the second and third platoons of Company D turned in their Scorpions and drew M113s with .50-caliber machine guns. There was no tank threat yet presented in the war and the company recognized that the M113 had already given good service for the South Vietnamese Army. There were also some doubts about the capability of the M56 in the Vietnamese terrain environment.

The crew makes its way out of the bush, all rounds accounted for on the area target they had selected. (US Army)

In Vietnam, the D/16th Armor performed all manner of tasks and missions, to include search and destroy, road and firebase security, clearing and securing landing zones, and operations with other elements of the 173rd as well as Vietnamese units. It served effectively as a mechanized maneuver element for its brigade. The M56s were used as direct fire support for the rest of the company, including some use on route patrols and reconnaissance. At times, 90mm canister ammunition proved handy to clear paths through bamboo groves for the company's maneuvers. Difficult to operate and maintain in Vietnam and eventually relegated to base security, they were turned in for more M113s in late August 1966.

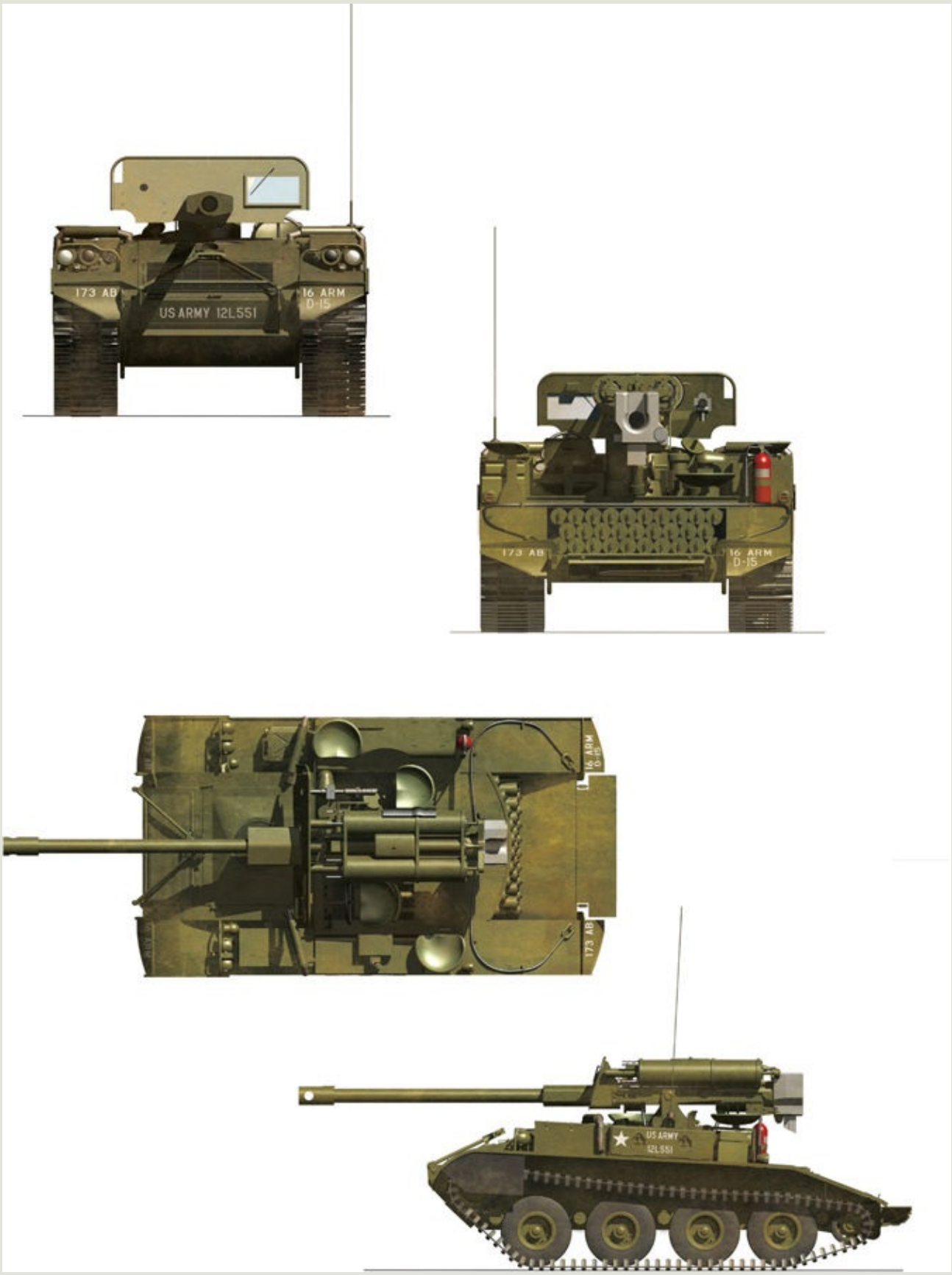
The 1st Platoon, D/16th Armor halts in a field to coordinate and await reinforcement. Everybody had to remain alert with their rifles, because of the chance of surprise encounters with the enemy and the evident vulnerability of their open vehicles. (US Army)

E M50A1 ONTOS, BATTLE OF HUE 1968

An M50A1 vehicle rushes through its protective riflemen in order to fire on the enemy and then reverse back down the street so it can reload. The infantrymen are advancing carefully, some firing weapons, others observing for the enemy, especially ones with recoilless rifles or rocket launchers dangerous for the Ontos. The target for the Ontos is a North Vietnamese machine gun, firing from an aperture in a stone wall. The salvo of 106mm rifles will bring down the entire section of the wall.

Vehicle A33 was one of ten Ontos taking part in the battle, forming the first and second platoons of A Company, 3rd Antitank Battalion, now formed with C Company, 1st Tank Battalion and its commander. The vehicle was found and restored in the last ten years and is now on exhibit at the Marine Corps Mechanized Museum, Camp Pendleton.

F M56 SCORPION, D COMPANY 16TH ARMOR



Apart from the gun and its equipment, the M56 consists of a rectangular chassis, with the engine and transmission enclosed forward, and the remainder of the vehicle an open platform supporting the gun mount and gunner's position, driver, and driver's controls, two more crew seats and a radio set, with a final stepped lower platform at the rear for the ammunition stowage and miscellaneous items. The gun in travel lock position is 54in above the ground, compared to the firing height of 66in.

The suspension system is also relatively simple in design. However, this vehicle combines steel rims with pneumatic tires for the four road wheels on each side of the track. The idler wheel at the rear of the suspension is a steel rim with solid rubber outer wheel, and the sprocket wheel at the front of the track is similarly a steel rim with a solid rubber sprocket set. The road wheels are attached to torsion bars, with the front and rear sets being tube-over torsion bars for greater durability. Note that the fourth road wheel arm suspends its wheel from the rear, vice from forward.

The headlight group consists of the usual tank set of clear lens headlight (outboard), black lens infrared light (inboard) and the small marker light (center). Beside the left headlight group, there is a hooded blackout light and beside the right headlight group is an electric horn.

The M56 used a band track with rubber outer edges joined by steel bolts/plates to steel track shoes in the center with interior track guides that keep the track aligned and centered to the suspension wheels and sprocket.

Tactical markings are for the 5th vehicle of 1st Platoon, Company D, 16th Armor Regiment, forming part of the 176th Airborne Brigade.

D-15 in Vietnam, 1966. Crewman Wilson T. Gerald died in action a year later, by then a sergeant.

FOREIGN SERVICE AND VARIANTS

Approximately 100 M56s became available to US allies in 1964–65 through the Military Assistance Program. Although some were evaluated by NATO allies, such as Germany, the only actual exports were five to Spain in 1965 and 87 to Morocco in 1966–67. Reported use of the M56 by the South Korean Army probably relates to some of the 60 M56s declared surplus there by the 1st Cavalry and 7th Infantry divisions, at the end of the Pentomic era. However, the Korean hills usually created difficulties for operating the Scorpions and 7th Infantry Division preferred the 106mm mounted on Jeeps.

The Spanish Naval Infantry took a platoon of five M56s into its service, from 1966 to 1970. They formed as the antitank platoon in the Antitank and Antiaircraft Gun Company, Heavy Weapons Battalion of the Support Group, in the Regiment of the Fleet (Tercio de Armada). They could not be supported after 1970 because of parts shortages and were placed into storage.

The case of the Moroccan Army remains less clear. Only a single battalion became operational, with the M56 and the rest of the vehicles remaining in storage. Little is known about the doctrine of employment and most available photos show only unit training and defensive positions occupied in desert or coastal settings. Curiously, 25 of these were reported still in service in 2010 (*Jane's World Armies: 28*), but most likely remained in storage.

Variants

Although the US Army tested prototypes for using the M56 as a carrier for the 4.2in mortar and 106mm recoilless rifle, none were so converted.

The US Navy acquired surplus M56s for conversion and use as mobile land target drones for its aviation arm, as the QM-56. After removing the gun, the Navy technicians installed radio-controlled robotic attachments to the throttle, steering, and transmission shifter allowing the QM-56s to maneuver at top speed across the bombing ranges of Fallon, Nevada, and Warren Grove, New Jersey while fighter bombers strafed and bombed them. Few, if any, were knocked out, and most required some patching for multiple runs. They were operational during 1966–70, whereupon the Marine Corps continued with their use at Cherry Point, North Carolina for several years.

The Navy also collected approximately 65 M50 chassis, less their recoilless rifles, at China Lake, California, for presumably similar use. Most still remain and it would appear that further interest in land target drones lapsed.

In 1960, the West German Bundesheer evaluated an M56 at its testing stations located at Trier, Meppen, and Munster. This evaluation took place while the Germans undertook development of their own 90mm tank destroyer. Because of its lack of armor, there was less interest in its use, although the rearming with the 76mm gun or 106mm recoilless rifle was proposed as a solution to the 90mm recoil problem. This M56 was retained in service by the Germans for towing artillery and finally as a firefighting vehicle at Meppen Range. It today resides in the Dresden Military Museum.

Spanish Naval Infantry (Marines) parade on October 12, 1967, in Madrid with their solitary platoon of M56s, among other units. They acquired them for the same reasons that the US Marines had done so with the Ontos, seeking something handier than a medium tank to support the infantry regiment, in this case, their sea regiment. (US Army)

G M56 OF SPANISH NAVAL INFANTRY, 1967

The Spanish Marines used the M56 in the same fashion that the US Marines operated the M50. However, they retained the regimental antitank company through the 1960s, and used the M56 as the heavy weapon of that company, which otherwise had infantry recoilless rifles. They acquired only five through the Military Assistance Program, and operated them until the early 1970s, when more modern vehicles became available.

Leading this operation is vehicle 41, the platoon leader's M56, painted in the Naval Infantry semi-gloss green, a darker hue than that which the US Marine Corps used. On the gun shield, gunner's side, is the Naval Infantry Shield with the tactical markings of the Grupo Especial (upper arc) and subordinate Grupo de Apoyo (lower arc), to which the antitank company belonged.

The deepwater fording kit consisted of extensions to the exhaust and intake pipes. The fording kit uses an extension pipe to raise the intake cleaner hood to a height approximately 8in above the top of the gun shield. In front of the gun shield, right and left side, the two engine exhaust pipes are turned in their mounts 180 degrees for deepwater fording, now pointed straight up and topped with an exhaust cover. These devices increased the fording depth from 42in to 60in of water.

The landing craft in use are Spanish Type BDK, former British LCT(4) class vessels. Personnel wear battle dress, and US M1 helmets with duckhunter-type camouflage covers. The officer holds a Spanish Z-45 submachine gun.

CONCLUSION

Neither the M50 nor M56 vehicle was derived from the other and apparent similarities or connections sometimes cited in various sources merely stemmed from the common approach by the Ordnance Department for such small combat vehicles and the use of various components it had developed independently for such use. Nor was it a case of the Army discarding a vehicle and the USMC picking it up as a cheap issue item. The USMC had abandoned independent procurement of armored fighting vehicles upon the US entry in World War II and perforce monitored all Ordnance activities for possible application to its requirements.

The key to these US vehicles in the mid-1950s was simplicity of design, low cost, and a notion that they would be considered “expendable.” The resulting design facilitated quantity production and employment.

The two programs provided the desired support: 45 M50s for a Marine Corps division, 6x 106mm recoilless rifles each; 47 M56s for an airborne division, with one 90mm gun each.

Within the limitations of the technology of the day, they remained adequate antitank weapons through 1965. The scientists of Project Vista in 1952 had thought that Western Europe could be defended against the Soviets by infantry strongpoints filled by 900 211-man infantry companies (200 for rear area defense) and 6,636 M50s, protected by six million conventional antitank mines and 14 million non-removable antitank mines. The US Army in the end preferred to field a conventional balanced force of all arms that eventually appeared viable with allies to defend NATO territory.

Neither the US Army nor the Marine Corps ever developed a doctrine for training and maintaining the crews of “expendable” vehicles.

FURTHER READING

Books

Dunstan, S., *Armour of the Vietnam Wars*, Osprey, London (1985)

Estes, K. W., *Marines Under Armor: The Marine Corps and the Armored Fighting Vehicle, 1916–2000*, Naval Institute, Annapolis (2000)

Flint, K., *Airborne Armour*, Helion, Solihull (2004)

Zaloga, S., *M551 Sheridan: US Airmobile Tanks, 1941–2001*, Osprey, Oxford (2009)

Government reports and documents

Converse III, Elliott V., *Rearming for the Cold War, 1945–1960: History of Acquisition in the Department of Defense*, Vol I, Historical Office, Office of the Secretary of Defense, Washington (2012)

Department of the Army, Technical Manual, Operation 90mm Full Tracked Self-Propelled Gun M56, TM 9-2350-213-10, Department of the Army, Washington (1958)

Final Report, *Project Vista: A Study of Ground and Air Tactical Warfare with Especial Reference to the Defense of Western Europe*, 10 vols, California Institute of Technology, Pasadena (February 4, 1952)

US Marine Corps Technical Manual, *Rifle, Self-Propelled, Full Tracked Multiple 106mm, M50A1 Operation and First Echelon Maintenance*, TM-00545B-10, Department of the Navy, Washington (1963)

US Marine Corps Technical Manual, *Organizational Maintenance, Rifle, Self-Propelled, Full Tracked Multiple 106mm, M50A1*, TM-00545B-20, Department of the Navy, Washington (1964)

US Marine Corps Technical Manual, *Rifle, Self-Propelled, Full Tracked Multiple 106mm, M50A1 Field and Depot Maintenance*, TM-00545B-35/1, Department of the Navy, Washington (1964)

Miscellaneous

Gillard, M., “M50 Ontos: Le Plus Gros Revolver sur Chenilles,” *Tank Zone* (April–May 2010), pp.42–73.

The author visited Fort Knox in 2006 and rode their restored M50A1. Only infantry type 106mm rifles remain available for such efforts, as the M40A1C rifles were retrofitted to M40A1 type after the retirement of the Ontos. (Author collection)

AUTHOR

Kenneth W. Estes is a 1969 Naval Academy graduate who served in a variety of command and staff assignments in the US Marine Corps until his retirement in 1993. He earned his doctorate in European History in 1984 and has taught at Duke University, the US Naval Academy, and local schools. He is the editor of several books, and has written extensively in military and academic journals throughout his career. Kenneth was made an Honorary Legionnaire in the Spanish Legion in 1992.

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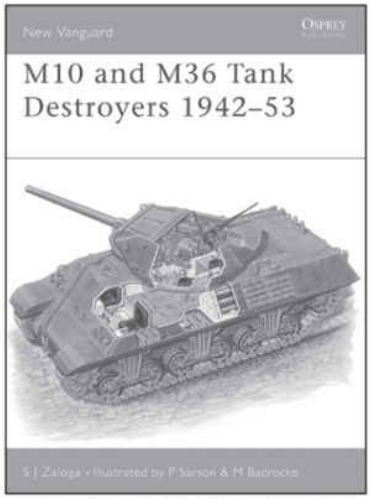

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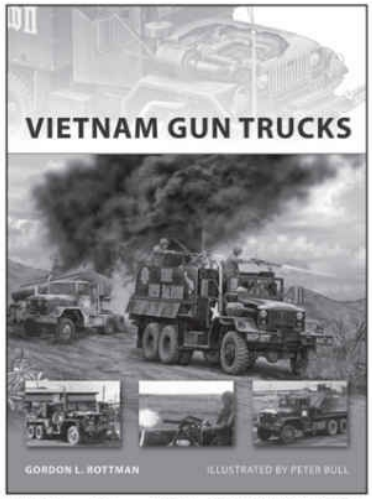

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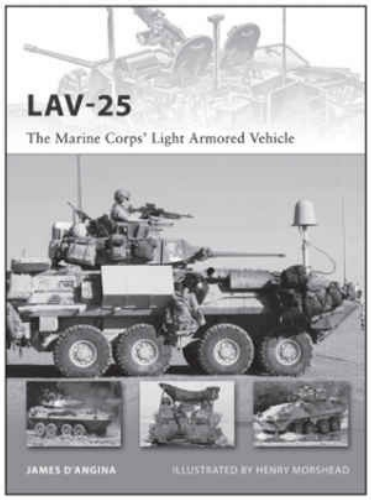

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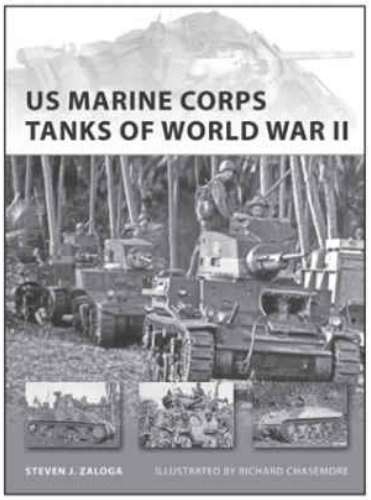

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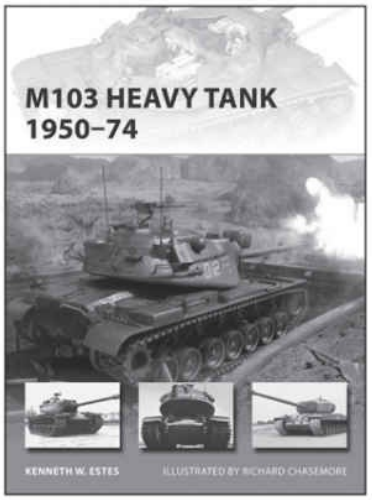

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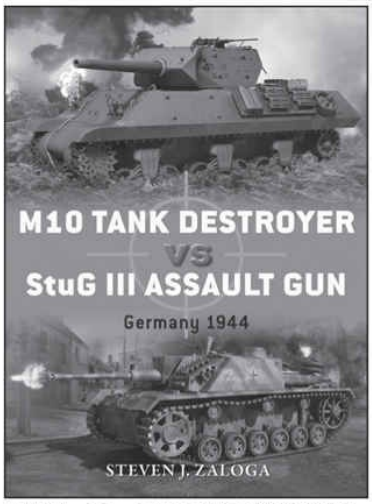

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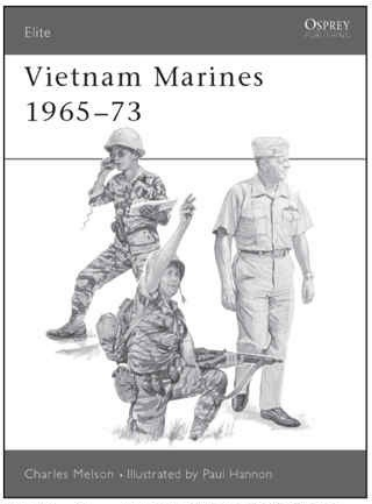

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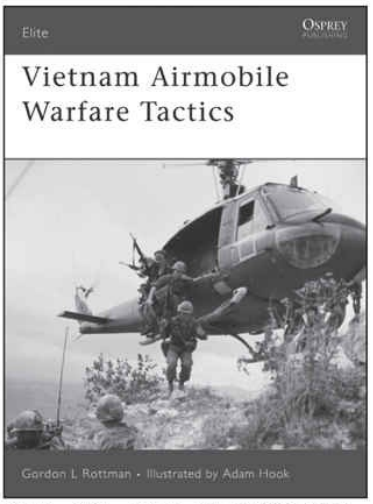

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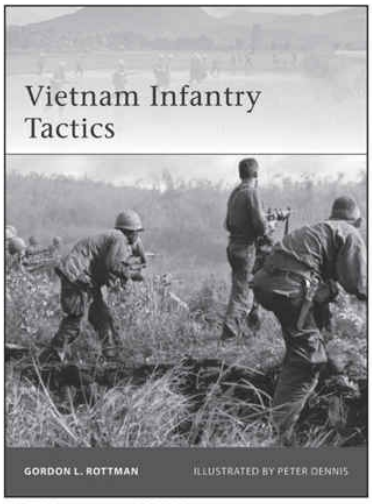

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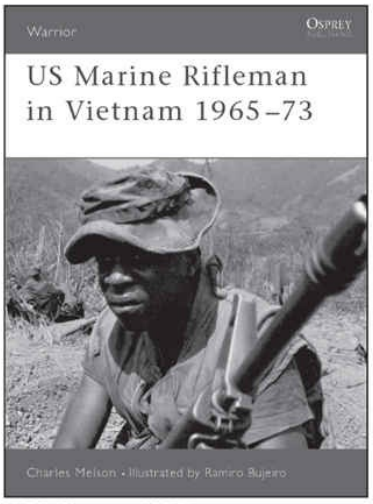

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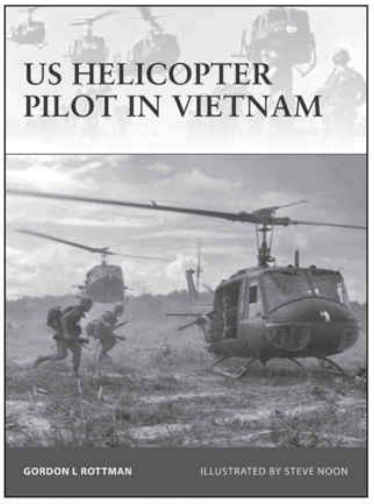

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